THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

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TO GAS COMPANIES.

FIRE-CLAY Retorts and Fire Goods.

The Advertiser has brought his Fire-Clay Retorts to great perfection, both as to quality and finish. Many have stood three and four years.

Every description of Fire Goods in any quantity always on hand. The Fire Clay is the very best in the North of England. Stock never less than 10,000 tons weathering.

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Aug. 22, 1856.

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Application, stating wages required, and references to character and ability, to be made to Mr. ALFRED YOUNG, at the Works of the Stoke Fenton and Longton Gas Company, Stoke-upon-Trent, STAFFORDSHIRE.

TO GAS COMPANIES AND OTHERS.

FOR Sale, a Station-Meter, by Samuel Crosley, to register 6000 feet of Gas per hour, fitted with Time-piece, Tell-tale, and 5-inch Connexions, in good working condition.

Also, a GOVERNOR, with 9-inch Connexions, and three 9-inch Hydraulic Valves.

Removed to be replaced by larger ones.

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PIRNIE CANNEL.—The Proprietors of the PIRNIE COAL COMPANY are now prepared to ship their excellent Gas Coal in the Frith of Forth, or put it on the East Fife Railway. It contains but little sulphur, and yields over 10,000 feet of 26 candle gas per ton. For particulars apply to Mr. ROBERT CARRICK, Manager, PIRNIE COLLIERY, LEVEN, FIFE.

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JOS. COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE.

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire Clay Retorts in the United Kingdom; and orders for Fire Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their works as above.

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Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

WANTED, for the Youghal Gas- WORKS, an active person, fully qualified by ability and experience to perform the following duties:

To Erect Retorts and Manufacture Gas on the newest and most improved principles.

To superintend the Laying down of Mains and Service-Pipes.

To Erect Public and Private Fittings, Lights, and Meters, and to keep them in perfect working repair.

To take the Indications of Meters.

To keep an account of the Coal received, and of the Coke, Breeze, Tar, &c., sold, and to act as General Superintendent of the Works.

Testimonials as to efficiency and character will be required.

Any further information as to the duties, &c., will be given on application to JOHN W. BRASIER, Esq., Chairman of the Town Commissioners.

H. BROWNE, Clerk.

Town Commissioners' Office,
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WILLIAM COCHRAN CARR,

begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

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Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

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THOMAS EDGE,

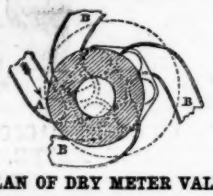
MANUFACTURER OF PATENT WET AND DRY GAS-METERS,

AND GENERAL GAS APPARATUS AND FITTING WORKS,

59, GREAT PETER STREET, WESTMINSTER, LONDON.

Station Meters, Experimental Meters, and Gasholders; Governors, Pressure Registers, By-pass and Slide-Valves, Photometers, &c.

PATENT DRY METER, with ECCENTRIC ROTARY VALVE.



PLAN OF DRY METER VALVE.

Important Notice.

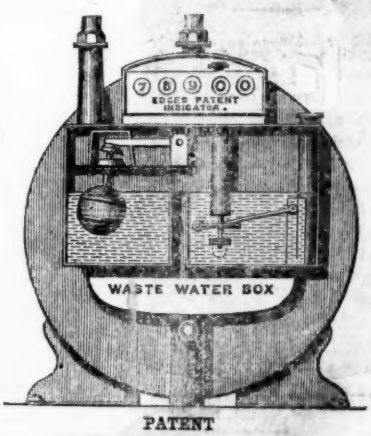
THOMAS EDGE, from his long and intimate experience of Dry Meters, being aware of the great imperfections which exist in the valves of all those hitherto in use (whether made by himself or other manufacturers), notwithstanding their extensive use by several Gas Companies, has the pleasure to announce that he is at length enabled to introduce to their notice a Meter (invented by Mr. Hyams), with a Valve the peculiar movement of which must commend itself to every scientific man as not liable to become defective.

It is well known that the Valvular Surfaces of all Dry Meters hitherto made, whether slide or rotary, very soon become separated, and allow a portion of the gas to pass through unregistered. The reason of this is that by the erroneous principle upon which these valves are constructed every particle of deposit from the gas is constantly carried along the same path without ever being removed, and thus a gradual accretion of solid matter takes place, and the valve-cover is lifted from its seat.

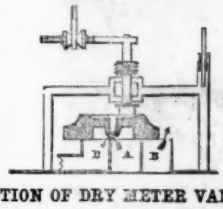
Mr. Hyams has, however, effectually remedied this fatal defect by the invention of his ECCENTRIC ROTARY VALVE, the great peculiarity of which is that the valve-cover revolves freely about its centre, while the centre itself is carried through a small circle about the main-shaft of the instrument by the eccentric which connects the two. The combined motions thereby cause every point in the surface of the valve-cover to describe a constantly-varying epicycloidal curve, and therefore produces a perfect wiping action, by which all extraneous matter is immediately removed.

The Diaphragms in this Improved Meter being formed of almost solid plate surfaces, do not admit of any variation in the measuring-chambers, while the friction is reduced to the smallest amount by the very few joints in the Diaphragms; and the general simplicity of the Meter will be obvious to every one.

T. E. continues to manufacture large numbers of his PATENT LEVER VALVE WET METERS, so generally used by Gas Companies, upwards of 70,000 of them having been called for since the Patent was granted. This Meter is the only one which cannot be tampered with to the injury of either the Gas Company or the Consumer.



PATENT LEVER VALVE WET METER.



SECTION OF DRY METER VALVE.

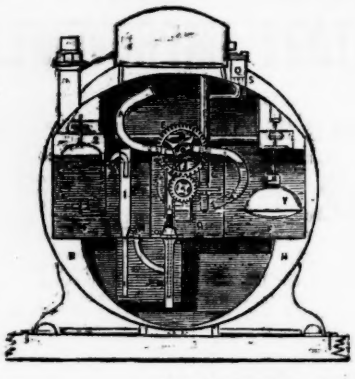
GAS-WORKS ERECTED FOR LIGHTING TOWNS AND NOBLEMEN'S AND GENTLEMEN'S MANSIONS.

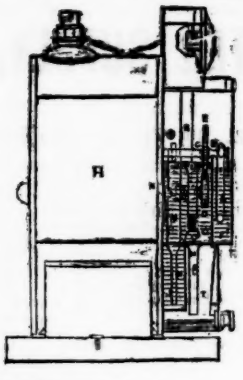
JOURNAL OF GAS LIGHTING ONE PENNY NEWSPAPER

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON.





SOLE LICENCEES AND MANUFACTURERS OF

W. CROSLEY'S AND CROSLEY AND GOLDSMITH'S

PATENT STANDARD SELF-ADJUSTING AND COMPENSATING GAS-METERS,

By which the True Water-Line is constantly maintained, and accuracy of measurement at all times secured. SEVERAL THOUSANDS OF THEM HAVE BEEN FIXED, AND ARE NOW AT WORK, and numerous Testimonials from eminent Gas Engineers, expressive of their approbation of them, may be seen at the Manufacturers'.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENTAL METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

C. and Co. continue to manufacture ordinary WET METERS of the very best description, Mr. W. Crosley having been for many years the principal and confidential assistant of his relative, the late Mr. Samuel Crosley, of Cottage Lane, City Road, up to the time of his decease, in which capacity he communicated to W. C. the secret of the mixture of the metals which has rendered the Crosley Meter so durable and superior to all others, as is evidenced by a large number of them being still at work, after having stood the test of nearly a quarter of a century's use.

By Her Majesty's Royal Letters Patent.

JAMES MEACOCK,

MANUFACTURER OF PATENT DRY AND IMPROVED WET METERS,

Also of every Description of Apparatus used in the Gas Factory, as well as in Gas Distribution.

7, SNOW HILL, AND GILTSPUR STREET, LONDON.

ESTABLISHED 1836.

PATRONIZED BY ALL THE GAS COMPANIES OF THE METROPOLIS, AS WELL AS MOST OF THE PROVINCIAL TOWNS.

J. MEACOCK'S PATENT DRY METER.

OLD VALVE OF THE ORDINARY DRY GAS-METER.

In the accompanying Diagrams of Meters will be seen J. MEACOCK's patent method of securing the Leather Diaphragm of his IMPROVED PATENT DRY METER. Instead of using the soldering iron for the purpose, by which the Leather is more or less injured, it is held between two flat Metal Rings, and screwed up sound on to a frame to receive it, the outward rim of which and screw-heads are shown in the drawing.

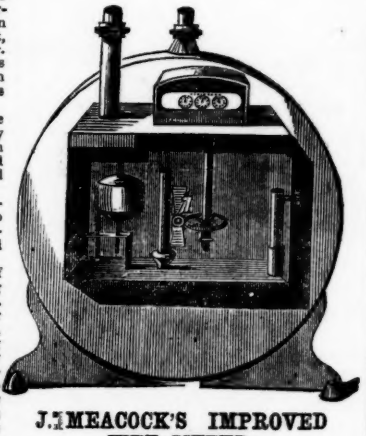
The Valve adopted in the above Patent Meter is also shown, as well as the ordinary Slide-Valve; the advantages of the former in not rising from its facing will be very apparent to the practical Gas Engineer, to whom it is of vital import.

J. MEACOCK begs leave most respectfully to submit to the notice of Gas Companies his PATENT DRY GAS-METER, trusting thereby to receive the same encouragement that has been so kindly awarded him in respect of his Improved Water-Meter, which has been patronized by all the Metropolitan Companies, as well as most of the Provincial Gas-works.

The public having been induced to desire Dry Gas-Meters in preference to Wet, and many Gas Companies being willing to yield to their wishes, J. M. has been induced to apply himself to the production of a Dry Meter, for which he has obtained Her Majesty's Royal Letters Patent.

Very frequently in fitting up the ordinary Dry Meter, the leather of the diaphragm is destroyed during the process of soldering, by coming in contact with the hot soldering iron. In his present process, J. M. has done away with its use, no solder being necessary, the leather being secured by two flat metal rings, between which it is screwed, riveted, or overlaid; the perishing effect of hot tools to leather being avoided, its durability must be longer; also, by this means, its repair when needful is most simple, as a new leather diaphragm can be applied by merely unscrewing the old one from the rim or frame to which it had previously been screwed up sound. In the ordinary Dry Meter frequent variations of registry have been detectable from defective valves, which tilt or rise from their facings: the slide-valve of this Patent Dry Meter will not allow any carbonaceous matter common to coal gas to tilt or lift the slide from its facings, and hence no variation. The heavy wear and tear to which the Meters of Gas Companies are subject, have at all times made it desirable to have them of the best materials and workmanship. J. M. begs leave to assure those who may honour him with their commands, that nothing but the stoutest materials for cases, the hardest gas-resisting metals, and best foreign leather for the interiors, will be used, and none but first-class workmen employed in their construction (the properties which his Improved Water-Meter is well known to possess, and which has obtained him that extensive patronage), will be strictly carried out in his PATENT DRY METER.

In respect of any orders with which he may be honoured, he is willing to give a guarantee to keep the same in repair, *free of all charge*, for three years, and allow the customary discount off the original list price.



J. MEACOCK'S IMPROVED WET METER.

NEW VALVE OF J. MEACOCK'S PATENT DRY METER.

Wet Gas-Meters Repaired and Reconstructed with J. Meacock's Modern Improvements.

METERS SENT ON APPROVAL.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 22, 1857.

NOTES UPON PASSING EVENTS.

MR. COWPER has *verbally* commenced the parliamentary campaign of his party with an apparent frankness we are little accustomed to from that clique. He has already brought into the House of Commons his new Public Health Bill, and has read it for the first time; but, with the usual tact (?) of the Richmond Terrace College, he has contrived to delay the publication of the printed copies of the bill, even though he himself has solemnly declared "that it was the same bill which was read a first time last session," and therefore might, for all practical purposes, have been printed even before being read. Knowing as we do the principles of the guides of public opinion who at present mislead the amiable Jupiter Bifrons of the Privy Council, we are naturally anxious about the delay which has already taken place in the publication of the bill. "It is not, and it cannot come to good." But if, indeed, Mr. Cowper should not have been deceived, there will be the most urgent necessity for a careful supervision of the conduct of the Government, with respect to this measure, on the part of all those who are concerned in the development of the private enterprise of the country; for, as we showed in the course of the last session, the bill then introduced by Mr. Cowper would effectually annihilate all independent local action, and subject local institutions to the "fatherly guidance" of the well-paid Government clerks. At that time we said, and we again repeat the assertion, that the House of Commons is bound to refer the whole question of the legislation as to the public health to an open and a *fairly-constituted* select committee. We subline *fairly-constituted* designedly, because the select committee of 1855 was notoriously packed, and was even presided by Sir B. Hall, who had a direct pecuniary interest in the question referred to it, and who, moreover, carefully suppressed a public challenge which was made in the committee-room as to his right to sit upon the committee. All the legislation which has hitherto taken place upon the subject of the public health, has, moreover, been based upon the reports of paid commissions, or it has been hurried through Parliament at periods of the session when an examination was impossible. Yet between 1848 and the present day no less than twenty-seven documents, Acts, bills, or reprints of bills, have been submitted to the Legislature, with the avowed object of placing the subject on a definite footing, and now we are menaced with a new bill; for we fear that little faith can be put in Mr. Cowper's assertions as to this measure's being merely the reproduction of the bill of July last. Surely it is time to cast aside a system which at best is so empirical, but which we firmly believe to be so corrupt; and, for the sake of the dignity of the British Legislature, it must be the duty of all parties to call for a full and fair inquiry into the whole of the important question of the public health. As parties are at present constituted, who will be able to secure such an inquiry?

We call serious attention to an analysis of the Public Health Bill of July last, which has just appeared in the *Parliamentary Remembrancer*. It would be a mere repetition of Mr. Toulmin Smith's arguments were we here to state our objections to this monstrous bill; and we therefore content ourselves by referring to his valuable paper, and by expressing our entire adhesion to the opinions he has thus recorded. Mr. Cowper's bill, and Mr. Smith's comment, should be read conjointly by all who are interested in public works.

The Public Health Bill is not, however, the only piece of "humbug" of the last session our modern Solons seem anxious to revive. They have got up a cry for conferring the electoral franchise on members of the learned professions; and Mr. Chester and his party have contrived to oust Dr. Booth, Colonel Sykes, and some others from the Council of the Society of Arts on some unintelligible quarrel about Mechanics' Institutes and other examination nonsense. As to the electoral franchise of the learned professions, we at once stigmatize it as "twaddle," in spite of the great men who have espoused it. No established professional man can carry on his business without occupying a house or chambers such as to entitle him to a vote, if he would only take the trouble to look after the registration of his own name. Then we are obliged to confess that the result of our experience amongst the members of the professions we are more immediately connected with, is not such as to make us desire to see them endowed with political power, solely because they are members of learned bodies. Such bodies are rarely independent; and, after all, engineers and architects should, we think, rather pride themselves on the inherent rights they possess as citizens, or members of the State, than seek to group themselves in any distinct class. Then, as to the quarrel between Dr. Booth and Mr. Chester, all that it seems necessary to say is that the disputes of these "guides" of public opinion argue little in favour of the moralizing effects of a scientific education, and are not, therefore, of a nature to increase our respect for the learned classes. Is it fortunate that Mr. Chester—a man of no note in the scientific world, but a great "snob"—should have ejected Dr. Booth and Colonel Sykes? We think, after all is considered, that it is. At any rate, when certain people get on horseback they go fast and far.

In the provinces, we observe that the unfortunate town of Southampton, after having suffered from the guidance of the Board of Health for six or seven years, and after having within that period expended no less than £32,440 upon its sewerage, is now exposed to a claim of £10,000 for the damage done to the Floating-Bridge Company's property, besides being called upon to expend upon the completion of its sewers a further sum of £20,000, according to Mr. Simpson's estimate, or £3250 according to that of the local surveyor. All parties agree in condemning the system hitherto imposed by the authorities of Richmond Terrace; yet neither Mr. Willcox nor Mr. Weguelin asks for an investigation into an abuse of governmental influence which has proved so prejudicial to their constituents. It is, indeed, to be observed that the lowest estimate yet presented for rectifying the blunders of the General Board of Health at Southampton is £18,200—making the grand total about £53,000—and this, too, in a place already tolerably well sewered, and presenting many natural facilities for works of this description!

At Dover nearly the same disastrous results have attended the "guidance" of the General Board of Health with respect

to the water supply, as may be observed at Southampton with respect to the drainage; and the members of the Local Board of Health evidently are becoming convinced that, "for the work required to be done, private enterprise could accomplish it at half the cost" of the working expenses of the board. This is, in fact, the principle we have always maintained, and we rejoice exceedingly that the good people at Dover are arriving at the same conclusions. It would, indeed, be a great advantage to the ratepayers of this town if they were to transfer the duties of supervision of such works as their water supply from the hands of unpaid, lukewarm, deputies to men who might be directly interested in their satisfactory and economical working; and, to confirm them in the feeling which seems to be gradually gaining ground, we would urge them to examine what is actually taking place elsewhere—at Newcastle, at Leeds, for instance. The water supply of the former of these towns is in the hands of a much-maligned, but a really very efficient company; whilst the latter town has adopted the principles of the Manchester school, and taken the water supply into its own hands. The consequence has been that Newcastle has a copious supply at a cheap rate, for which those only pay who derive a direct benefit from the use of the water; whilst in Leeds the actual selling price is high, and the whole town is more or less taxed to maintain the present very unsatisfactory system. Fortunately, the corporation of Leeds has vigorously resisted the introduction of the Public Health Act, or there would, no doubt, have been a still more costly and unsatisfactory water supply to their town than they actually possess. But the error of the whole of the Manchester school to which we have referred consists in the attempt to make the community undertake duties which could be, and which ought to be, executed by private traders. At Manchester itself a suspicion of the truth of our opinion is apparently making way; and the gas consumers are clamouring for a reduction in the price of that article, which the Town Council has hitherto sold at an exorbitant price, in order to indulge the spurious charity of distributing water at unremunerative rates. Such a system "of robbing Peter to pay Paul" will, however, always prevail when men have the means of shifting their own share of the public burthens on to other people's shoulders. The people at Dover should ponder these things.

By the way, we observe that the dyers of Leeds behaved in a manner which cannot be too strongly recommended to the attention of the manufacturing public, during the investigation before the Select Committee of the House of Lords on the Improvement Amendment Bill of the last session. They took care to be well represented, and they obtained a full and fair hearing of their case. The consequence was, that they secured for themselves an exemption from the arbitrary powers of an intended "smoke clause," and they triumphantly refuted much of the nonsense which had been uttered on the subject. When will manufacturers learn that their property is always exposed to the attacks of the blind guides who devise smoke bills, and other theoretical interferences with trade operations? and when will they learn to combine permanently to resist their permanent enemies? There is, indeed, a necessary and inevitable antagonism between manufacturers and red-tape officials; and the former must adopt the skilful organization of their enemies if they would retain the freedom they still possess. A properly-organized Trades Protection Society is required; in fact, as much in the interest of the Government as of the manufacturers themselves, for evidently the State must ultimately suffer from the introduction of measures which injuriously affect large classes of its subjects; and the Legislature has, we believe, been allowed to deceive itself, because the parties whose interests have been most seriously affected have taken no pains to make themselves heard. Even in the question of the partnerships with limited liability, the trading community took no steps to arrest the progress of a measure which we then, as we do now, proclaim to be a fearful mistake; and the community may be sure that, unless it exerts itself earnestly, it will be further exposed to the disastrous consequences which have ensued from the empirical *dilletanti* legislation of late years.

It is strange what absurd ideas prevail even in this classic land of constitutional government as to the real boundaries of State intervention in commercial affairs. Even the Marylebone politicians, who have sat at the feet of the great (quondam) advocate for local self-government, Sir B. Hall, recently asked that Parliament should fix a maximum price for gas—as if Parliament could render the cost of manufacture and distribution a certainty, or could even fix the invariable value of money. Then, again, the talkers of the local metropolitan boards of works are calling for the re-enactment of some indirect taxes, of a very unfair character, which now swell the funds of the City. We had hoped that the recent discussions upon political economy had enlightened the public on these questions; but, alas! error has strange vitality, and, as we said before, it is very agreeable to some people to cast their share of the public burthen upon other men's shoulders.

In the meantime, no efficient steps have been taken to settle the great question of the London intercepting sewers, and Sir B. Hall may flatter himself on the success which has attended his efforts to discover the means "how not to do it." He has certainly been a most efficient Marplot. Fortunately, the public begins to discover this fact, and, of course, the power of such men to do mischief ceases with their being understood.

THE ADULTERATION OF FOOD BUGBEAR.

One more of the many bugbears by which the gullable public are so easily deluded has been brought to an untimely end, and is being "wound up" in the Bankruptcy Court with the usual accompanying exposures of fraud. The "London Unadulterated Food Company (Limited)" professed to have the good of the community so strongly at heart, it offered so many advantages to the shareholders, independently of a well-assured dividend of 15 per cent., and its title chimed in so harmoniously with the popular outcry against the adulterations of food, that it promised to have a flourishing career. The prospectus, indeed, presented so tempting a bait, that it is a matter for surprise more fish were not caught by a hook so skilfully disguised. The company was to prove "an effectual remedy" for the protection of the poor man's pocket and the poor man's health from "the dangerous fact" of adulteration. "The slow and sure poisons" that are being introduced into the system of the impoverished individual in particular, and of other persons in general, were to be annihilated by the company, which ensured "perfect freedom from adulteration" in all its articles, and, to complete such security, "one of the most eminent chemists of the day" (Dr. Letheby to wit!) was engaged as analyst. These analyzed, pure, unadulterated articles were to be vended at wholesale prices to the shareholders, thereby giving additional value to their shares, whilst a wholesale and export trade of unequalled magnitude was as good as guaranteed; and "after careful calculation, and allowing for every contingency," the net profits could not be less than 15 per cent. Here, then, was an undertaking that combined the greatest public benefits with no mean personal advantages, and yet it will scarcely be credited that the public were so dead to the calls of benevolence, and so blind to self-interest, that they could not be induced to take more than 377 £20 shares in so praiseworthy and lucrative an enterprise. Whether it was that the chief promoter and principal manager of the company bore the ominous and somewhat startling name of *Cribb*, whether the prospective advantages were considered too great to be realized, or whether, after all the outcry against the adulteration of food, there was no real apprehension of danger—whichever cause operated to produce such an effect we will not determine, but merely record the bare fact that but 377 shares of the London Unadulterated Food Company (Limited) were disposed of and paid for. Among the shareholders there figure, as is usual in such cases, a large proportion of clergymen, for it is to be observed that of all the gudgeons which swim in the waters of speculation there is none so easily caught as the clergyman. Being prevented by his profession from engaging actively in business, he is always on the look-out for some lucrative investment of his capital, and, when the hook is baited with a compound of philanthropy and large-seeming dividends, he rushes at it with heedless vivacity, and thus readily falls a victim to designing knaves.

The proceedings in the Bankruptcy Court on the winding-up of the London Unadulterated Food Company throw some additional light on the manner of getting up a company with limited liability. An office with a long table, an adequate supply of chairs, and a large book bound in morocco leather and with gilt clasps, constitute the material elements of the company. With these elements, and often before they are provided, the promoter, having associated with himself an adept in the art of company-making, who is to officiate as the secretary, sets to work. A provisional prospectus is drawn up, describing an El Dorado that requires only a certain amount of capital to dig up the gold and to yield profits amply sufficient

to pay dividends on the shares of from 15 to 50 per cent., besides conferring at the same time inestimable benefits on the public. The next thing is to secure some directors whose names may give the appearance of respectability to the undertaking. Impoverished lords, needy baronets, and worn-out gentlemen may be found who, by the presentation of a number of free shares and the offer of £100 per annum for attendance at the "board," with contingent advantages, will accept the office of directors; and solicitors and bankers being readily forthcoming, the concern assumes the importance of an incorporated company. The manager, of course, appropriates a large portion of free shares to himself as a recompense for his valuable services in forming the company, and his duties as manager are to be remunerated with a handsome salary. He can do no less for his associate, the secretary; and their friends also make good claims for a portion of shares. The company is thus set afloat, with a goodly show of shares entered in the large book bound with morocco leather and gilt clasps, but without a farthing paid into the bank. The net being then spread, and the hooks well baited, the fish begin to bite. The first one caught by the London Unadulterated Food Company was a retired colonel in the East India Company's service, who was persuaded by the manager and secretary to take a sufficient number of shares to qualify him to become a director, and to pay down the sum of £100. This was the first money really received, and it appears from the colonel's affidavit that it found its way into the pocket of Mr. Cribb instead of to the credit side of the company's account at the bankers. The colonel had the honour to be appointed a director of the company early in December last. He hastened from his residence in Norfolk to take his seat at the board, and to share the emoluments of office, when he was met with the blank intelligence that the company could not afford to pay directors' fees, and that for the time being Mr. Cribb and the secretary were sufficient to manage the affairs without assistance. They managed, indeed, so cleverly as to sink the sum of £3000 in salaries and other expenses, and to show that there was not the least probability that the proposed objects of the company would be attempted to be carried into operation. The majority of the directors and shareholders finding that they had been grossly deceived, and that the scheme for supplying unadulterated food was little better than an unadulterated fraud, petitioned the Court of Bankruptcy to be released from their connexion with Messrs. Cribb and Co. by a winding-up. Such is a brief sketch of the history of the London Unadulterated Food Company (Limited), as gathered from the voluminous joint petition of Colonel Austin and the Rev. Mr. Hunt; and fifteen other clergymen, holding 160 shares in the company, were equally desirous to bring the disgraceful affair to a close.

The futility of attempting to prevent the adulteration of food by centralizing the supplies in the hands of a commercial company, has been aptly illustrated in the birth, parentage, life, and death of the Unadulterated Food Company. Supposing the shares to have been taken more freely, and that Messrs. Cribb & Co. had commenced the supply of bread, groceries, confectionery, and pickles, can it be supposed that the public would have been treated more scrupulously than the shareholders, and that the articles vended by that irresponsible fraternity would have been more free from adulteration than those purchased from tradesmen, known individually to their customers, and who have the good opinion of their neighbours to maintain? The manufacture and sale of food by the Government, or by a public company, even when conducted irreproachably, is not likely to improve the quality nor to preserve the purity of the articles vended; but when, in addition to the usual adverse concomitants of public management, there be added the influence of self-interest, and the liability to fraud under the lax supervision of Government officials or of limited responsibility, the centralization of the supply of food would prove a most undesirable substitute for the ordinary shopkeeper. The public have expressed this opinion unmistakably in the article of food respecting the adulteration of which there has been the loudest outcry. Companies have been started, from time to time, for the supply of better and cheaper bread; but they have, one by one, dwindled into insignificance, and the regular baker finds his custom uninjured, notwithstanding the competition of these would-be monopolists.

The bill introduced in the last session of Parliament by Mr. Scholefield would, if it were carried in the form proposed, create a number of nice berths for the place-hunters, who have raised the alarm about the adulteration of food, to nestle in more comfortably than in a Government store for supplying the public with unadulterated provisions. Its preamble sets forth that "the practice of adulterating articles of food and drink for sale, in fraud of Her Majesty's subjects and to the great hurt of their health, requires to be repressed by more effectual laws than those now in force for that purpose." The bill then proceeds to call into existence an army of officials, consisting of food inspectors, chemical food examiners, and food analysts, to be appointed by the local authorities and by the General Board of Health, unto whom all the vendors of food are to be delivered over, to be dealt with according to their will and discretion. The provisions of the bill are so stringent and vexatious, and would be so liable to abuse by ignorance, prejudice, bribery, or malice, that one very serious effect of the measure, if carried into operation, would be to prevent respectable persons from placing themselves in positions in which their characters would be completely at the mercy of capricious, revengeful, ignorant, or mercenary tyranny. The supply of food would thus be in danger of falling into the hands of unprincipled men, who would be always striving to deceive or bribe the inspectors, and too hardened against shame to care much for the exposure of detection. Mr. Scholefield's proposed measure, while it would deal thus harshly and unjustly with the respectable shopkeeper, depriving him of an Englishman's right to trial by jury in charges affecting his character as a man and a tradesman, makes no distinction between adulterations that may be perfectly harmless and those which are poisonous. The former are comparatively venial offences, but the mixing of poison with food is a crime that ought to be punished with the utmost severity. Mr. Scholefield, however, metes out the same amount of punishment to both alike, and he allows the poisoner to escape, on payment of a fine, to repeat on the same easy terms his practices against the lives of Her Majesty's subjects. The bugbear of the adulteration of food seems to have frightened the Brummagem legislator from his propriety. He cannot look at it with sufficient steadiness to distinguish its separate features; he only sees that it is a monster to be got rid of, and he attempts to do so even at the sacrifice of justice and common sense, unmindful that his plan for exorcising the horrid spectre would but magnify its proportions and conjure it into another form still more hideous and much more seriously to be dreaded.

Circular to Gas Companies.

The agitation in the metropolitan parishes against the districting arrangements of the gas companies continues unabated, and the course it has taken shows more clearly the impolitic conduct of the Chartered Company in raising the price of the public lights at the critical moment of effecting the change. The feeling of the delegates has been further exasperated by the indiscreet comments of a contemporary, who was supposed by them to express the opinions of the companies interested in the movement; and at the adjourned meeting on the 16th inst. increased hostility displayed itself by the rejection of a resolution opening the door for compromise, and by the adoption of others for bringing the question definitively before Parliament. It will be observed, from the report of the proceedings inserted elsewhere, that the Equitable Company have most successfully answered the gross misrepresentations of one of the delegates at the previous meeting, and shown that their conduct to St. Martin's parish, which they have lighted for the last 25 years, has been most liberal since the recent arrangement. A conference of the delegates with the other metropolitan gas companies would, we have little doubt, have also dispelled many of the present misapprehensions, and have ended in a satisfactory adjustment of the existing disagreement. But the delegates have refused to take the initiative to that means of reconciliation, and, in alarm at the attitude assumed by the Chartered Company, have resolved upon an appeal to the Legislature and the Government.

We have inserted elsewhere, out of deference to the source from whence it comes, a letter from "A Gas Shareholder," but by so doing it must not be inferred that we either approve of its tone or adopt its views. Unlike the movement of 1849 and 1850, the present one has a singularly disinterested and unselfish character. There is now no 2d. per 1000 feet in per-

spective to lure a Mr. Pearson into action, or visions of bricks and mortar to excite the ambition of an engineer, or a host of paid electioneering agents set in motion to create an unnatural agitation. A breach of an implied engagement has roused the indignation of the guardians of the public interests, and excited suspicion as to the good faith of the parties with whom they are compelled to deal; and, sticklers though we may be for the rights of industry, we cannot say that the circumstances do not justify the course adopted by the Marylebone authorities, however much we may dissent from the views expressed by some of them, through want of information, as to the real merits of the matter. We have combated the schemes of selfish agitators, and shall continue to do so, but we have the greatest consideration for the honest and spontaneous expression of public opinion; and we apprehend the majority of the metropolitan companies will aid rather than obstruct the course which the delegates have enunciated in the subjoined resolutions:—

That it is desirable that the metropolitan parishes should concur in an united application to Parliament by petition, or on the motion of the metropolitan members, for a committee of inquiry into the existing arrangements for the supply of gas to the metropolis.

That a committee of one representative of each district be appointed to prepare such petition, and that the vestry of St. Marylebone be requested to communicate the same to all other parishes, and solicit the affixing of the common seal of each vestry or district board to such petition, and that the same be entrusted to the respective borough members of Parliament.

That a deputation composed of the representatives present, and such others as may be nominated, do wait upon the Home Secretary (the members of Parliament for the metropolis being also invited) to represent the evils of the existing monopoly, and to solicit the aid of the Government in protecting the interests of the ratepayers by supporting the proposed committee of inquiry. That a copy of these resolutions be forwarded to each metropolitan member, with a request that he will concur in an arrangement to secure the aid of the Government in granting such committee, and join the proposed deputation to the Home Secretary.

We might have preferred seeing friendly negotiations opened direct with the companies, as the speediest means of coming to an amicable understanding: as the matter stands, this course has become impracticable.

It is not likely that Parliament will interfere to remedy *anticipated* grievances, and as yet the ratepayers will find it difficult to prove that they have any real grievance to complain of. The advanced price charged by the Chartered Company for the public lights of Marylebone parish, which has been the cause of the present agitation, will be found on examination to leave them still unremunerative. Although one of the speakers at the recent meeting of delegates attempted to show that the company would derive a profit of 75 per cent. from the public lights, his calculations were founded on transparent fallacies. Assuming the price of £3. 10s. per lamp to be equivalent, as he stated, to 3s. 6d. per 1000 feet, the cost of cleaning, lighting, and repairing, at the rate of 15s. each lamp, would reduce the cost per 1000 feet to 3s.; and any one acquainted with the charges incident to the manufacture and distribution must be aware how little profit can be made from the sale of gas at that price. We repeat, nevertheless, that the Chartered Company were impolitic in raising the price at such a time, and that they should have accepted the position in which they had placed themselves, though accompanied with loss, which, under other circumstances, it would be unreasonable to expect them to suffer. The price now charged is, indeed, less than was paid to the Chartered Company in times of competition, before the Equitable Company—during a quarrel with the former—took the contract from them; therefore, the recent advance in the tender cannot be truly attributed to monopoly. It is just possible, however, that some members of the Government, in their anxiety to meddle, may make it a pretext for attempting to place the metropolitan gas companies under more stringent regulations than are provided for in the Gas-Works Clauses Act, or to impose the now popular but absurdly unjust guarantee of a maximum price, without regard to the cost of coal. It is manifestly to the advantage of all parties that they should keep out of the clutches of parliamentary agents and lawyers by a reasonable and liberal consideration of their respective claims and interests; and, as the recent arrangement for partitioning the metropolis among the various gas companies is calculated to create alarm, it is to their interest to show that that alarm is unfounded, and to offer such guarantees against the possible abuse of the power thus obtained as may be reasonably required. We hope, therefore, that, acting on the principle that liberality is the best policy, the metropolitan gas companies will voluntarily take the initiative in such an arrangement, and not be deterred from doing what is right by punctilious observances and false pride.

It appears to us opportune, at a moment when this untoward incident has been seized hold of for resuscitating charges of extortion and oppression against the metropolitan gas companies, which have been long since disproved, to avail ourselves of the publicity given of late years to the balance-sheets of most of the companies, for ascertaining on authentic data the financial statistics of the gas-making trade of the metropolis. We have accordingly prepared from these documents the comparative table of the charges, capital, income, expenditure, and profits of the respective companies, which will be found in an adjoining column of our present issue; and we purpose repeating its publication every six months, after the conclusion of the half-yearly meetings, for the purpose of clearly tracing the effect of the late districting arrangements upon the finances of each company. The present table concludes the period of insane warfare and strife between the metropolitan gas companies, except in respect of those supplying the City of London; but, so far as these latter are concerned, experience has proved that it is merely a question of time as to when they adopt the same system. Two premature attempts have been already made to effect that object, and recent events will not be without their effect when the time arrives for renewing the negotiations.

The table presents a remarkable coincidence between capital employed by each company in earning a certain gas rental, when the variations in the charges for gas are taken into consideration. Reducing all to the uniform standard charge of 4s. 6d. per 1000 feet, it will be seen that, with few exceptions, an average capital of about £450 is employed for every £100 of gas rental. The Chartered and South Metropolitan stand considerably below this average in consequence of their having in past years paid for their extensions out of profits; but this expenditure must be treated as a debt due to the shareholders, and may, by the authority of Parliament, be converted into debentures, as was the case with the Imperial Company. Certain irregularities in the issue of the original shares of the London will explain the excessive nominal capital of that company; and the advantageous terms upon which the Commercial Company purchased the land upon which its works are erected accounts for its moderate capital.

Assuming that a capital of four and a half times a gas rental, at 4s. 6d. per 1000 feet, is invested and employed by the metropolitan gas companies in carrying on their undertakings, it will require that every £100 of rental should yield £27 profit in order to pay a dividend of 6 per cent.—a profit attained by only one company (the Phœnix), which charges 5s. 6d. in a small portion of its district, and whose works are most favourably situated for the delivery of coals, and for the sale of the residuary profits. A remarkable instance, in the contrary direction, of the incubus hanging over such undertakings, for want of similar facilities, is to be found in the case of the Chartered, where all the materials have to be carted, and other expenses incurred, whereby their earnings are reduced to £17. 16s. 5d. for every £100 of gas rental (the minimum of all the companies)—a result which may be expected to induce the directors to consider the practicability of removing their factories to more eligible sites. A positive economy of upwards of £10,000 per annum might unquestionably be effected by such a measure, and it is worth while seriously investigating whether it may not be carried out without trenching upon the present profits of the undertaking. The Paris Gas Company sold the sites of three of their works in populous neighbourhoods for more money than the new works built to replace them, out of the city, will cost.

The only other item in the table calling for observation is the large proportion of the gross cost of coals realized by the sale of residuary products by the London Company. This is principally due to the partial use of the Paris system of gas-making ovens, by which an excellent hard coke suitable for locomotives is produced, worth double the ordinary gas coke. Considerable improvements have been made in the details of the ovens in Paris since those at the London (Vauxhall) Works were erected, and we have a strong impression that the problem which has so long engaged the attention of gas engineers is upon the point of being solved, and that in new gas-works, in the vicinity of important railway termini, good gas and coke may be advantageously produced by one and the same operation.

COMPARATIVE TABLE OF THE CHARGES CAPITAL, INCOME, EXPENDITURE, AND PROFIT OF THE METROPOLITAN GAS COMPANIES, AT MIDSUMMER, 1857.

Name of Companies in the Order of their Formation.	Parliamentary Maximum Charge per 1000 Feet of Gas.	Present Charge per 1000 Feet of Gas.	Capital employed for every £100 of Gas Rental.	Gross Expenditure in Coals for every £100 of Gas Rental.	Net Cost of Coals for every £100 of Gas Rental, the Residuary Products being deducted.	Working Expenses, exclusive of Coals, for every £100 of Gas Rental.	Gross Cost of Gas for every £100 of Gas Rental. *d*	Net Cost of Gas for every £100 of Gas Rental.	Net Profit upon every £100 of Gas Rental, applicable to the Payment of Interest and Dividends.	Returns from Coke, Tar, Breeze, and Liquor, for every £100 expended in Coals.	Net Profit per Cent. per Annum earned upon the Capital employed.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
CHARTERED GASLIGHT AND COKE COMPANY*	No limitation . . .	4s. without meter-rent in the City; 4s. 6d. and (cannel) 6s. with a meter-rent in other districts	341 3 8	57 8 11	37 18 7	44 5 0	101 13 11	82 3 7	17 16 5	33 19 5	5 4 5
CITY OF LONDON DO. . . .	No limitation . . .	4s. and (cannel) 6s. without meter-rent	455 17 8	53 15 3	30 8 4	45 0 4	98 15 7	75 8 9	24 11 3	43 8 4	5 7 9
IMPERIAL DO. . . . . †	6s. with a meter-rent .	4s. 6d. with a meter-rent	*a*	..	..	..	..	..	..	..	..
RATCLIFF DO. . . . . †	5s. 6d. with a meter-rent	4s. 6d. with a meter-rent	439 5 8	53 5 6	34 2 9	40 2 10	93 8 4	74 5 6	25 14 6	35 18 5	5 17 1
PHŒNIX DO. . . . . †	No limitation . . .	4s. 6d. and 5s. 6d. in the rural districts, with a meter-rent	418 16 1	46 5 2	22 5 1	49 1 9	95 6 11	71 6 10	28 13 2	51 17 9	6 16 10
INDEPENDENT DO. . . . . †	No limitation . . .	4s. 6d. with a meter-rent	*a*	..	..	..	..	..	..	..	..
EQUITABLE DO. . . . . *	No limitation . . .	4s. 6d. and (cannel) 6s. with a meter-rent	476 19 0	50 6 5	34 1 1	43 2 1	93 8 6	77 3 2	22 16 10	32 6 5	4 15 9
SOUTH METROPOLITAN DO. . †	No limitation . . .	4s. 6d. and 5s. 6d. in the rural districts, with a meter-rent	251 12 0	48 14 8	25 15 9	49 17 7	98 12 3	75 13 4	24 6 8	47 1 7	9 13 5
LONDON DO. . . . . *	No limitation . . .	4s. 6d. and 5s. 6d. in the rural districts, with a meter-rent	590 1 8	50 15 1	22 14 1	53 4 5	103 19 6	75 18 6	24 1 6	55 5 3	4 1 7
COMMERCIAL DO. . . . . †	No limitation . . .	4s. without meter-rent	397 19 10	68 18 7	48 19 11	29 1 4	97 19 11	78 1 3	21 18 9	28 18 4	5 12 11
GREAT CENTRAL CONSUMERS'	4s. without meter-rent.	4s. without meter-rent	425 3 10 *b*	..	..	..	..	..	..	..	..
WESTERN CANNEL (LIMITED)*	No limitation . . .	6s. with a meter-rent	459 4 7 *c*	46 12 9	37 7 2	36 9 0	83 1 9	73 16 3	26 3 8	19 17 10	5 14 0 *e*
SURREY CONSUMERS' GASLIGHT ASSOCIATION †	4s. 6d. while the dividend is 8 per cent., and 6s. should the profits be less than 8 per cent., with a meter-rent.	4s. 6d. with a meter-rent	400 18 0 *b*	..	..	..	..	..	..	..	..

* Companies affected by the recent districting arrangements.
† Companies already districted by mutual arrangement, or by legislative enactments.
a The accounts of these companies are not accessible to the public.
b Both these works are carried on by a contractor, who provides the trading capital; and, while this system is continued, these companies form exceptions which render it impossible to ascertain their actual working charges and profit.
c The nominal capital exceeds this, in consequence of the B shares having been issued at a discount.
d This column is introduced for the purpose of showing the great extent to which the companies generally depend upon residuary products for their profits, as the gross expenses in two instances exceed the gas rental, and in several others nearly equal it.
e A fraction less than 5 per cent. upon the nominal capital.

Correspondence.

THE MARYLEBONE VESTRY AND THE CHARTERED GAS COMPANY.

SIR,—I have lately been amusing myself with the account in your JOURNAL of the "sayings and doings" of the vestry of Marylebone parish and the deputations from the other parishes on the subject of the so-called gas monopoly, and cannot quite satisfy myself whether ignorance, self-sufficiency, or folly most abounds: there can, however, be no doubt that all three are present in large quantities. In Marylebone the presiding genius seems to be Dr. Bachhoffner, who modestly contradicts his brethren, on the ground that "he knows something of gas," while in the same breath he shows his utter ignorance of the subject. He peremptorily asserts that "the character of the burner has nothing to do with the illuminating power of the gas." Oh! most learned doctor, do you really mean to insist that a burner consuming five feet of gas per hour will not give a greater light than one burning four? or that one consuming four will will not beat one burning only three? or do you intend to assert that an Argand or Leslie burner, consuming five, four, or three feet per hour, will not be more brilliant than a batswing consuming the same quantities? If so, let me beg of you, before trying to teach others to read, to learn the alphabet yourself.

The learned pundit then talks largely of the necessity of ascertaining the exact quantity of gas to be supplied to each public light, evidently for the sole purpose of raising an outcry against the gas company, as he must well know, if he knows anything, that all the parish have to look to is the illuminating power of each light, and to which the tender strictly binds the contracting company. Again, he says the Chartered Company charge more for an eight-candle burner than the Equitable did for twelve.

Oh! fie, learned doctor, how can you be so ignorant or untruthful; for you well know that the Equitable Company only contracted to supply four feet of Newcastle gas per hour to each burner, and that that quantity will not give a twelve-candle light, or anything like it.

The "sayings and doings" of the deputations are not tinged with so much self-sufficiency as the doctor's, but, if possible, with more ignorance. They confine themselves to raving about uniformity of price, now and for ever, and the great impudence of the gas companies in insisting upon the right to lay mains wherever they have entered into contracts for lighting.

Have these wiseacres bound all the contractors for bread, meat, coals, and other articles required by their parishes to furnish them at the same price for ever? or have they bound themselves always to supply their customers with ribbons, soap, candles, beer, and other small groceries in which they deal at one uniform rate? and, if they have not, why have they not? as these articles do not fluctuate more in value than coals, iron, machinery, and other articles on which the manufacture—and, consequently, the price—of gas depends. Have they also bound themselves to give every assistance to the gas companies when they require to lay enlarged mains or to build additional works for improving the supply of gas, instead of thwarting them and placing every obstacle in the way of improvement?

Do these talkers really mean to say that 4s. 6d. is an unreasonable price for 1000 feet of such gas as is supplied by the London companies? or do they mean to assert that the price hitherto charged for the public lights has been too high? Nothing of the sort: ignorant as they are, they know better than to make such absurd assertions. Rely upon it, sir, that none of these matters have anything to do with the present agitation. The insane ravings of these wiseacres are not caused by any such questions; they simply arise from the feeling of these "Jacks in office" that "Othello's occupation 's gone"—that they will no longer be allowed to rob the gas companies as they have hitherto done—they can no longer prattle to their children and chuckle to their wives, when returning inflated from their nightly vestries, how they have done the gas companies—they will no longer be able to brag how they have compelled the companies to furnish gas below the cost price to the public lights as a condition for being allowed to supply this almost necessary of life to their fellow-parishioners; and which condition, if they could have entertained two ideas at once, or been able to see an inch beyond their noses, they must have known could have no other effect than that of increasing the cost of what was almost a necessary of life to the tradesman, whilst those who rode in their carriages were enjoying a comparative luxury at less than its value, and in order also that they might obtain a temporary popularity by their short-sighted wisdom.

Pray, sir, use your powerful pen to enlighten these parish Solomons, if possible, by a few simple truths, and at the same time inform them that the managers of gas companies are not so weak as to adopt the suicidal course which they predict.

A GAS SHAREHOLDER.

SUGGESTED ASSOCIATION OF THE METROPOLITAN GAS OFFICERS.

SIR,—Will you allow me to suggest through your JOURNAL, for the consideration of directors and secretaries of gas companies, the propriety of forming a society of the principal officers of the London companies, for the purpose of consulting together periodically respecting gas matters generally, with a view to promote the interests of the several companies, and to adopt means to remove or lessen the prejudicial feeling existing in the minds of the public with reference to the recent arrangement of districts, &c.

In order to test the willingness of engineers and secretaries to meet for the purpose of forming such a society, I beg to propose that all who feel any disposition to attend should write a line to you to that effect before the publication of your next number, when I will, until a better is named, act as secretary *pro tem.*, and summon a meeting accordingly.

It is hardly necessary to add, that unless the disposition to meet is tolerably general a meeting will not be convened.

I enclose my card, but beg to appear in your JOURNAL as

AN OFFICER OF THIRTY-SIX YEARS' STANDING.

London, Dec. 18, 1857.

HILLS *v.* THE LONDON GAS COMPANY.

SIR,—I have observed a paragraph in your last number, stating that it is doubtful whether I mean to proceed to a new trial to establish my patent for the use of hydrated oxide of iron. I beg to inform you there is no doubt on this subject; and, now that the judge has discovered his error, the trial will be proceeded with as soon as possible.

F. C. HILLS.

Chemical Works, Deptford, Dec. 17, 1857.

VALUE OF THE CHELTENHAM SEWERAGE MANURE.

SIR,—I believe it to be a general rule amongst chemists to determine the relative value of a manure according to its per centage of nitrogen in the shape of ammonia: therefore, with a view to prove the value of the manure obtained from the sewerage of the town of Cheltenham, I made a set of experiments. First, I ascertained that only 5 per cent. was soluble in boiling water; secondly, I boiled the solid matter for some time with potash and water, which gave no evidence of the evolution of ammonia. This, of course, was sufficient to convince me of the misapplication of the term *manure*, and the little reliance to be placed on it as a fertilizer.

The sewerage passes through several vats or compartments; the liquid passes off, leaving behind a pultaceous mass, consisting of leaves, herbage, mud, and sand. This, mixed with one-third coal ashes, furnishes the manure in question, and is sold at 3s. 6d. per square yard, equal to about one ton. The liquid matter which has separated is deodorized by quick lime, and then allowed to run out into the river. Of course, this fluid contained all the soluble or saline matter, such as urate, phosphate, and sulphate of ammonia, with chloride of ammonium. The addition of the quick lime would therefore *dissipate* all the ammonia.

It has been stated that the solid matter when applied to the land has proved very beneficial and produced large crops, but this I much question, seeing that I could not obtain any ammonia, and am inclined to think that the effect is more due to the spade and judicious turning up of the soil.

JOHN HORSLEY, F.C.S.L.

The Laboratory, Cheltenham, Dec. 18, 1857.

Register of New Patents.

1412.—CHARLES WEIGHTMAN HARRISON, of Woolwich, in the co. of Kent, civil engineer, for "*Improvements in obtaining light by electricity.*"

Patent dated May 20, 1857.

The patentee obtains electric light by causing electricity of any suitable degree of power to pass through, decompose, or vaporize compounds of metal with other elementany bodies, such as the metallic oxides, chlorides, fluorides, sulphides, and other similar combinations, whether found in nature or prepared artificially; also the metallic salts, both acid, alkaline, and neutral. These are for the most part, in their ordinary solid state, classed as non-conductors of electricity, but when rendered fluid by heat, they, with some exceptions, acquire a high degree of conducting power. Such of these substances as are capable of becoming conductors by the application of heat, either derived from an electric current or other means, are therefore fused or liquified, and then, by any suitable arrangement or contrivance, a small stream or streams, or drops of such melted compound, is caused to form a portion of electric circuit, or to pass through or within that part of its course where the electricity in motion is subject to great resistance. By this means the compound undergoes decomposition or molecular modifications, according to its nature, and at the same time yields a luminous effect of, in some cases, the most brilliant kind.

Likewise, electric light is obtained from a stream or streams of melted metal or melted compound of two or more metals. For this purpose is preferred to use those metals which assume a fluid form at comparatively low degrees of heat, such as platinum, sodium, tin, bismuth, lead, zinc, &c., or compounds of metals are used which can be made fluid at low degrees of heat, like the alloys known as fusible metal. Such stream or streams of fused metal are caused by any convenient arrangement to form part of an electric circuit, whereby the flowing metal may be partly or wholly vaporized or changed, and light produced.

Instead of a flowing or stream electrode, a reservoir of a melted or fluid body is sometimes employed as the positive electrode, and a carbon or solid metal self-regulating negative electrode is used therewith. The reservoir is formed of glass, and the fluid electrode contained therein is covered with a float or ring made of any suitable infusible material, so as to confine evaporation to a central aperture in the float.

When it is desirable to enclose the light in a tube or shade of glass, the apparatus is constructed so that the rarefied air or vapour may serve to heat the fused electrode. Suitable arrangements are also made for retaining or condensing the vapours arising from such of the hereinbefore named bodies which it may be desirable to preserve.

That portion of this invention which relates to the employment, as electrode, of a stream or streams of melted metal or metals, or of melted compounds of metal, with other elementary bodies, is performed by placing a supply of such of these substances that are desired to be used in a reservoir, which is so constructed and placed that the contents may be readily heated by a passing current of electricity, or by steam or vapour, or by hot water, or any other convenient means which will produce liquifaction in such substances. A stream of the melted electrode is then caused to flow through an orifice in the reservoir, the volume of the stream being proportionate to the power of the electricity employed, and this again having relation to the amount of light required and to the nature of the substance or substances forming the electrodes. In the line of the stream, or approaching thereto, and at any suitable distance from the orifice whence it issues, is placed a pencil, or disc of carbon, or other conducting substance, or a reservoir of metal, upon, or near to which, the escaping stream will flow. The stream electrode is connected with one of the poles, as, for instance, the negative of a voltaic or other battery, and the carbon, or second electrode, with the other pole; so that, on the passage of the current, the light may be produced at or about the point where they would, if not moved away, come in contact one with the other.

Such substances as admit of being made fluid by the heat arising from the passage through them of a current of electricity (of sufficient power to produce a light equal to all ordinary illuminating requirements) it is preferred to form into pencil electrodes of about the sixth part of an inch in diameter, and of any required length, the point being cut fine. An electrode of this kind is placed in a clay or glass tube, the aperture being adapted to its size, leaving a small space for the introduction of the end of a copper slide-rod, which is put in for the purpose of preserving contact with the electrode as it diminishes. A small orifice forms the mouth of the tube through which the point of the electrode passes, so as to form contact with the second electrode, and thus complete the circuit of the current within the lamp when arranged for operation. The electricity is conveyed to the slide-rod by a metal guide-cap or frame fixed on the end of the tube, and joined to one of the wires from the battery. Amongst the various metals and metal compounds or alloys which have been found suitable to be employed in this manner, and to afford the most brilliant light, are the following: metals—potassium, sodium, zinc, tin, lead, and bismuth; metal compounds or alloys—first, equal parts of sodium and zinc; second, three parts tin, and one part lead; third, equal parts each of zinc, bismuth, and lead; fourth, two parts bismuth, one part tin, and one part lead; fifth, three parts lead, one part tin, and one part sodium; and sixth, eight parts bismuth, five parts lead, three parts tin, and one part mercury.

When it is convenient to fuse electrodes by the heat derived from other sources than that of the electric current, such as the waste steam of an engine, or the heated vapours of a furnace, either a tubular, or any other kind of reservoir, is used which is fit for the purpose. To the bottom of the reservoir is attached a short pipe, by which the fluid electrode is led to the lamp, where, as it issues through a small regulated orifice, it forms a stream electrode. Besides the various metals and alloys of metals hereinbefore enumerated, other less readily fusible metals and alloys may, in this manner, be employed, according to the degrees of heat to which they are intended to be subjected.

Of the different compounds of metals with other elementary bodies which have been employed in the production of electric light, it is preferred amongst the oxides to use the peroxide and the protoxide of potassium and the mixed protoxides of potassium and sodium, in about equal portions of each. Amongst the chlorides, the double chloride of sodium and aluminium have been employed. Of the fluorides that of lead, and of the sulphides that of copper, which yields a fine green light. Of the metallic salts the mixed carbonates of potash and soda, in the proportion of five parts of the former to four parts of the latter. The fused nitrate and chlorate of potash may be successfully employed. The patentee does not, however, limit himself to these particular compounds.

As a negative or second electrode a solid body is generally employed, such as carbon or one of the metals, but it is preferred to use two pencil carbon electrodes, in combination with one positive stream electrode, and to arrange these in a right line, one on each side of the stream. By this method the stream may be intersected at any desired point and the light obtained with great regularity. Sometimes a stream or a reservoir of a fluid body is used for the negative electrode, and its distance is so regulated from the positive stream electrode that when they are about to come into contact the circuit of the current may be broken and the light produced. A stream electrode being liable to derangement from the agitation of the air, a tube of glass is placed over it as a protection, and may be of any convenient size, leaving one or more apertures at each end, by which the heated vapours may be directed round the flowing electrode; and, when it is desirable, the upper end of the glass tube is connected with a pipe proceeding to a receiver of any suitable kind, so as to carry away and condense the vapours.

When electric light is obtained by employing a reservoir of a fluid body as the positive electrode, a cylindrical glass vessel is used, wherein is poured a supply of mercury; upon this is placed a float, made of a conical shape, and formed so that its base may accurately fit within the reservoir. This float may be made of refractory clay, or of platinum or other material, a small aperture being formed through it from the apex to the base. Into this aperture the mercury is impelled, so as to fill it, or nearly so, either by the weight of the float itself or by other pressure. A frame or case is then fixed over the reservoir, so as to carry a tube, which is free to work in a vertical position, the motion being given or controlled by an electro-magnet and keeper or by a helix of the conducting wire. In this tube is placed a carbon pencil electrode, its point being brought down to the mouth of the float and forming contact with the mercury. On connecting a voltaic battery with the apparatus, so as to complete the circuit of its current by rendering the mercury positive and the carbon negative, the latter is moved away from the mouth of the float and the light produced. The evaporation or consumption of the mercury is confined to the central aperture in the float, and, this being kept full by pressure, affords a constant supply of this electrode. As the carbon electrode diminishes, it approaches the mouth of the float by self-acting small periodic advances, thus preserving a very constant degree of separation between the electrodes. The construction of electro-mechanical motions of this kind are well understood. In place of mercury other fluid may be used as the positive electrode, or a solid body may by convenient means be kept melted, and in that state made to flow within the aperture of the float.

The claim is for—

1. The manufacture and employment of electrodes of melted compounds of metal with other elementary bodies.

2. The manufacture and employment of electrodes of melted metal and of compounds of two or more metals when made fluid by heat.

3. The construction and employment of a float in combination with a reservoir of a fluid electrode whereby evaporation or consumption of such electrode by the light is confined to an aperture therein.

1626.—Maxwell Miller, of Glasgow, in the co. of Lanark, N.B., brassfounder, for "*Improvements in cocks, taps, or valves.*" Patent dated June 10, 1857.

This invention relates to an improved system or mode of constructing valvular mechanism, such as cocks or taps, for pipes or ducts used in conveying or discharging fluids, and has for its object increased simplicity, efficiency, and durability. According to one modification of the invention, the valvular mechanism consists of a hollow ball or sphere, fitted to work in a spherical socket formed upon the pipe or duct. The socket is formed in two portions, which are screwed or bolted together by flanges, after the hollow ball is inserted. A diaphragm of vulcanized caoutchouc or other suitable flexible material is held between the flanges of the socket, and lies between the ball and the mouth of the pipe or duct by which the fluid reaches the valve, the fluid having access to the ball by a central aperture in the diaphragm. One or more perforations are formed in the thickness of the ball at one point, and when the ball is turned, so that such perforation or perforations coincide with the aperture in the diaphragm, the fluid has access to the interior of the ball. When, however, the ball is turned so as to shift the perforations away, the passage is closed, the flexible diaphragm forms a tight joint, and the pressure of the fluid which has access to the back of the diaphragm assisting the elasticity of the latter in keeping it against the ball. The fluid issues from the ball by an aperture which, if the apparatus is fitted to a line of straight piping, is directly opposite to the perforations admitting the fluid into it; so that when the ball is turned into the proper position, there will be a direct thoroughfare through it. In the arrangement just described, the ball may be turned by a spindle passing through an aperture to the outside of the socket. The arrangement is, however, obviously susceptible of various modifications. Thus, in a modification resembling the kind of tap known as a "water-crane" in many parts of Scotland, the ball has fixed to it a short bent pipe or "crane" for the discharge of the fluid, and this pipe projects through a slot in the outermost portion of the socket or cap, and is turned up or down and moves the ball with it into the positions required to open or close the tap.

The claim is for the combination in the arrangement and construction of cocks, taps, or valves of a hollow valve piece and a perforated diaphragm, the latter being disposed so as to be acted upon by the fluid pressure as herein described.

1632.—Etienne Lemoine, of Paris, gas-fitter, for "*Improvements in gas-meters.*" Patent dated June 10, 1857.

These improvements in gas-meters relate to the kind called wet meters, and consist in so placing a guard between the inlet-pipe and the float-valve as to prevent the latter being unduly lifted by a curved wire or other such means. The abstraction of water by suction, by the pipe used for its admission, is also prevented by a ball-valve, which closes the orifice immediately suction or such means are employed.

The claim is for the various arrangements described, for preventing a greater quantity of gas to pass through the meter than is indicated by its registering or dial work.

1695.—Frederick Warner, of Jewin Crescent, Cripplegate, London, for "*Improvements in supplying water to water-closets and other vessels.*" Patent dated June 17, 1857.

This invention has for its object improvements in supplying water to water-closets and other vessels. For this purpose the stem of the valve on the supply-pipe has on it a plunger or piston with a cupped leather (or other material), and such plunger or piston works within a chamber or cylinder closed at its outer end. The stem or spindle of the valve is made hollow, so that water may flow through it to the chamber or cylinder within which the plunger or piston works. On the interior of the chamber is a fixed wire or rod which enters into the hollow stem or spindle of the valve, so that as the valve is moved in order to open it, the stem or spindle thereof slides on the fixed wire or rod, whilst at the same time the plunger or piston on the spindle or stem of the valve is forced into the chamber or cylinder, the water in such chamber or cylinder readily passing the cupped leather in one direction, but not in the other; hence the valve will only close slowly, according to the space allowed between the hollow spindle or stem of the valve and the fixed wire or rod on which it slides.

The claim is for the combination herein described.

1702.—Thomas Lowell Ralph, and Thomas Lowell Ralph, the younger, of Birmingham, metal-rollers, for "*An improvement or improvements in the manufacture of metallic tubes.*" Patent dated June 18, 1857.

The claim is for manufacturing metallic tubes, by rolling a billet or hollow cylinder with rolls, whose opposed grooves present a nearly lozenge-shaped figure, the said billet being supported upon a mandril, having, in tranverse section, a figure, nearly resembling that of the figure formed by the opposed grooves of the said rolls, as described and represented; the said tubes being made cylindrical, and finished by rolling and drawing, or in any other convenient manner.

1722.—William Wright, of Sheffield, York, plumber, for "*Improvements in flushing apparatus applicable to cisterns and water-closets.*" Patent dated June 20, 1857.

This invention relates to the mode in which the flushing of the pan is

effected, and is done by the weight of the person occupying the seat, which is connected by levers with the valve attached to the cistern.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED PATENTS.

2794.—ANTHONY CHARLES SACRÉ, senior, of Brussels, mechanical engineer, for "*An improved apparatus for measuring water.*" Nov. 3, 1857.

2836.—WILLIAM DEVON, of 4, Maryland Terrace, Stratford, in the co. of Essex, for "*An improved self-acting apparatus for flushing water-closets, and the means of connecting the same, to water-mains, parts of which are applicable to the junction of gas or water pipes generally.*" Nov. 13, 1857.

2930.—WALTER MACFARLANE, of Glasgow, N.B., for "*Improvements in moulding or manufacturing cast-iron pipes, and other generally similar hollow articles.*" Nov. 23, 1857.

2934.—DAVID HULETT, of 55 and 56, High Holborn, London, for "*Improvements in cocks, taps, and valves, and in joints for pipes and tubes.*" Nov. 23, 1857.

2949.—WILLIAM THOMAS MANNING, of 20, Great George Street, Westminster, London, gentleman, for "*Improvements in the treatment of sewerage, and in the apparatus employed therein.*"

3016.—WILLIAM CALDWELL, of Liverpool, in the co. of Lancaster, engineer, for "*An improved fluid-meter, which may be used as a motive-power engine.*" Dec. 5, 1857.

3028.—JAMES STIFF, of the London Pottery, High Street, Lambeth, for "*Improvements in drain-pipes.*" Dec. 7, 1857.

3041.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, for "*Improvements in cocks and valves for regulating the flow of fluids.*" Dec. 8, 1857.

NOTICES HAVE BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED PATENTS.

2101.—GEORGE BROOKS PETITT, and HENRY FLY SMITH, of Oxford Street, London, gas engineers, for "*An improved cap or cover for the glasses of gas and other lights.*" Aug. 1, 1857.

2660.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, for "*Improvements in forming the joints of pipes for conveying water, gas, and other fluids.*" Oct. 17, 1857.

2822.—JOHN FORDRED, of Stoke Newington, Middlesex, gentleman, for "*Improvements in treating and purifying water.*" Nov. 7, 1857.

2930.—WALTER MACFARLANE, of Glasgow, N.B., engineer, for "*Improvements in moulding or manufacturing cast-iron pipes, and other generally similar hollow articles.*" Nov. 23, 1857.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.

WEDNESDAY, DEC. 2, 1857.

(Before Vice-Chancellor STUART and Mr. Justice ERLE.)

SCOTT *v.* THE MAYOR OF LIVERPOOL.

Mr. MALINS, Q.C., (Mr. COLLIER, of the common law bar, and Mr. KARSLAKE with him,) opened the case, and stated the bill was filed by James Scott and Joseph Nowell, who were contractors, against the mayor, aldermen, and burgesses of the borough of Liverpool, and against Mr. Hawksley, the engineer under the contract; and the object of the bill was to obtain an account of the works which had been done by the plaintiffs under the contract stated in the bill since the date of the last certificate given to them by the defendants' engineer, including all extra and additional works; and that the corporation might be ordered to pay what should be found due on that account. The bill also stated certain Acts of Parliament by which the defendants, the corporation, were authorized to purchase water-works, land, and property, and to construct the water-works described in the plans referred to, subject to the provisions contained in those Acts. The corporation being empowered to construct water-works, reservoirs, filtering beds, and everything incident to water-works, for the supply of water to the town of Liverpool, issued in 1851 specifications of the works which they proposed to have constructed; and those specifications were issued by way of invitation to persons in the situation of the plaintiffs—contractors—who should be desirous of constructing the works. There were five contracts, but the only one with which the court had anything to do on the present occasion was contract No. 5, which was for the formation of a reservoir called the Rivington reservoir, and filtering beds, tanks, and douglas feeder, and all the works appurtenant thereto and connected therewith. There was also what was called the Horwich embankment. On that specification the plaintiffs tendered to construct the works for the sum of £56,262. 8s. 8d., and it was for an account of what remained due upon that contract that the present bill was filed. The specification that was issued was, in substance, for the construction of the works which he had mentioned. When deviations and alterations were necessary, the contractors were not at liberty to go on unless they had notice in writing; because the corporation were not otherwise bound to pay for such deviations or alterations. Accompanying the specification which was issued were plans which the contractors had an opportunity of inspecting, and which, of course, were the basis of the contract entered into, although undoubtedly it was impossible for any person connected with such works to say that there might not be a deviation as to the depth to be sunk, and in many other particulars to some trifling extent, but the contractors were warranted in believing that the specification correctly represented what they would have to do. It, however, was found that that was not so. The plaintiffs having contracted for the construction of the Rivington reservoir and adjoining works, a condition was annexed that the site of the works was to be given up to the plaintiffs on the 1st of January, 1852. That, however, was not done, and in consequence of that, as the plaintiffs alleged, the works were delayed. The time of payment was from time to time, as the engineer should certify the work had been done, and there was a very stringent power given to the engineer, that, in case any doubts, disputes, or differences should arise touching or concerning the works or any of them, or relating to the qualities, quantities, or description of the works done and executed, or to be done and executed by the contractors, or the quantity or quality of the materials to be employed therein, the question should be referred to the engineer, who should have the absolute power of deciding the same, and that the contractors should not be at liberty to appeal to any court of law or equity. That was an attempt to oust the jurisdiction of courts of law and equity, and make the engineer the arbitrator to decide all matters.

The VICE-CHANCELLOR: You had the contract.

Mr. MALINS: It had been held that an agreement to refer to arbitration did not oust the jurisdiction of courts of equity. Of course the amount of £56,000 and odd was only an amount for the works which could then be the subject of estimation. That was subject to additions, and the plaintiffs were to be paid for all extra works to be ordered by the writing of the engineer or by his authorized agents. Therefore, although that sum was fixed, it did not at all decide what amount might ultimately have to be paid under the contract. The agreement between the plaintiffs and the defendants was dated the 6th of November, 1851; therefore on that day the parties became bound to each other. The contractors had to find two sureties, and accordingly the names of two sureties were given to the corporation. One gentleman, however, afterwards objected to execute the bond, and the only wonder was that anybody could be found who would execute bonds for the performance of such contracts as the one which the court was then considering. In consequence of the refusal of that gentleman, another gentleman's name was given, and the bond was executed on the 20th of March, 1853. The court would find in the answer that the defendants stated the delay took place in consequence of the bond not having been executed, but the evidence of the plaintiffs showed most distinctly that the sureties were perfectly ready to execute the bond from the month of November, 1851, down to the time when it was executed, whenever requested by the corporation, and that no delay in the execution of the contract took place on that account. The court would observe that this was a contract the execution of which was to commence on the 1st of January, 1852, and that the corporation were bound to put the contractors in possession of so much of the land as would enable them to proceed with the contract. It was stated in the bill that the possession of the land upon which the works mentioned in the contract were to be done was not given till the month of July, 1852; and it was an undoubted fact that the material part of the contract, that which would involve the greatest amount of expenditure and the greatest skill on the part of the contractors, could not be proceeded with for six months after the time contemplated by the contract, solely in consequence of the defendants having omitted to perform their part of the contract by putting the contractors in possession of the land. It appeared most distinctly by the evidence on both sides that the contractors were not put in possession of any part of the land until the month of May, 1852; so that from January to May, a period of five months, was absolutely lost, during which the contractors were complaining continually that they had their men, horses, and plant remaining idle at a great expense, because they were not put in possession of the land which would enable them to proceed with the contract, that being entirely the default of the corporation. However, in the month of May they commenced the execution of the contract, and they proceeded, as they alleged and proved, with all reasonable diligence. The plaintiffs proved that they had a sufficient plant and capital, a sufficient supply of men and boys, and everything required to execute the contract. From May, 1852, until February, 1855, they went on, but during the whole time the contractors were under this great disadvantage, that they were scarcely ever able to obtain an interview with Mr. Hawksley, who was the engineer. By the terms of the contract, the court would observe, they bound themselves no doubt in a very strong manner, though a manner which was usual in such contracts, and he (the learned counsel) confessed that one never could look at such contracts without wondering that men would bind themselves in the way they did. They made the engineer the judge to decide what works should be done, what time should be given for them, how much should be paid, and, in fact, to decide everything between them and the corporation; but that was upon the assumption that they would have the benefit of the integrity, the skill, the experience, and the character of the engineer appointed. It happened, however, that Mr. Hawksley, who was very largely engaged in undertakings of this kind, resided sometimes in Nottingham and sometimes in London; so that, instead of the contractors being able to have the advantage of Mr. Hawksley's knowledge on these subjects, they were not enabled to induce him to visit the works during the three years that they proceeded more than about six times, and those six visits were generally on a Sunday. The corporation appointed a gentleman named Oakes as sub-engineer, to superintend these works, and to protect their interests jointly with Mr. Hawksley. There was also a gentleman named Statham, who was resident engineer, and a Mr. Carter, who was a sort of sub-engineer appointed by Mr. Hawksley himself—paid by him, and acting on his behalf; so that the persons with whom the contractors were in communication were those three gentlemen. It appeared by the correspondence which was set out, that almost all the information that Mr. Hawksley possessed on the subject of these works, which enabled him to give any directions or to make any decision whatever, was contained in written communications made to him from some or one of those three gentlemen. The correspondence showed that the contractors complained from time to time that Mr. Oakes, who appeared to be the principal of the three gentlemen named, went to the works from time to time, and would give them orders to do certain things; while, at the next visit, he would order them to stop doing that work. Sometimes the contractors could obtain no orders from him whatever; so that, in consequence of his not giving orders, although frequently solicited to give them, and countermanding orders which he had actually given, there was continual delay in the execution of the work; and that delay the corporation now attempted to say was attributable to the want of capital—the want of plan and skill on the part of the contractors; while the plaintiffs said and proved that the delay was attributable, if not solely, mainly, at all events, to the circumstances which necessarily arose out of the position of the engineer and his agents. The greatest difficulty the plaintiffs met with was at the Horwich embankment. They had to sink to a depth of 50 feet before they found a bottom that was water-tight; and of this the defendants' engineer, with due diligence, must have been aware. In respect of all the matters in dispute, the plaintiffs claimed £29,000 as due to them.

The VICE-CHANCELLOR: Do the defendants say that nothing is due?

Mr. MALINS: The defendants did not pretend that the account was settled.

The VICE-CHANCELLOR inquired whether Mr. Malins asked for a decree similar to that in *Macintosh* v. *the Great Western Railway*—for an inquiry, in order that the chief clerk might ascertain whether anything and what was due to the plaintiffs in respect of the works and materials supplied under the contract?

Mr. MALINS replied that he should want to go a little farther. The water committee inspected the works that were going on under the several contracts, and they reported that out of the five contractors all, except Messrs. Scott and Nowell, had an insufficient plant; and they also reported that Messrs. Scott and Nowell's works were admirably done, and done to their entire satisfaction. They acquiesced in what was done up to the 28th of February, 1855, and therefore the plaintiffs must be paid for what was done. If the present bill were dismissed, the plaintiffs would be left without remedy. The works had gone on, payments had from time to time been made to the plaintiffs, and on one occasion only was an award made by Mr. Hawksley, and that was in respect of works done up to the month of November, 1852. The plaintiffs had sent in a claim for the works up to that period

for £11,931. 4s. 3d., and there was awarded to them a sum of £8300; but it turned out upon the face of the award that certain portions of the work for which the £11,931. 4s. 3d. had been claimed were excepted from the award. The award, which was dated the 19th of January, 1853, recited the contract for £56,262. 8s. 8d., and also recited a claim for £11,931. 4s. 3d., and the corporation did not agree as to the value of the works so executed by the contractor. On the 4th of November, 1852, a dispute arose between the parties respecting the value of the works. Upon the face of the award it expressly excepted certain portions of the works included in the claim, and therefore the account which was asked of the court would go back beyond the 4th of November, 1852, for the works excepted on the face of the award.

The VICE-CHANCELLOR asked whether it was contended that it was a complete forfeiture, and that the contract had been determined?

Mr. MALINS replied, they wanted a complete confiscation and a dismissal of the bill, the same as in many other cases of the same kind. The contract went on, and the plaintiffs did their best to execute it, and things appeared to have gone on peaceably until April, 1854. Up to that time claims were sent in by the plaintiffs from time to time, it being one of the terms of the contract that the corporation were to pay every month 80 per cent. on the work done. When the contractors wanted money, all that was necessary for them to do was to send in an account of how much work had been done, so as to justify Mr. Hawksley, or those who were acting for him, in giving a certificate that they were entitled to receive a certain sum. Accordingly, partly under the award which had been referred to, and partly under those requisitions, Mr. Hawksley, or those who were acting under him, gave certificates that entitled the plaintiffs to receive, and they did receive £49,942. 8s. 4d. In April, 1854, more money was required by the plaintiffs, and the defendants then required that the amount should be determined by Mr. Hawksley. On the 21st of April the plaintiffs received a notice to attend Mr. Hawksley, who was to arbitrate between them as to the amount to be received. Nobody doubted at that time that money was actually coming to the plaintiffs; the 20 per cent. was retained, of course, by the corporation, pursuant to the terms of the contract, and for that no demand was made, or could be made by the plaintiffs at that time; but in respect of the 80 per cent. it was not doubted that money was actually coming to the plaintiffs in April, 1854. On the 24th a meeting was held, and the matter was considered and fully discussed before the engineer, who had never made any award. The engineer had withheld certificates which the plaintiffs contended they were justly entitled to. In pursuance of the contract they immediately afterwards took possession of the plant, and they were bound, of course, to pay the full value of that plant. They said the value of it was £3800. In the letter of the 20th of August, Mr. Hawksley took upon himself to say that there was nothing but a few barrels and engines of an improper character, and that it was ridiculous to say that such a plant was a proper one to construct works of this value; but when they took possession they found that it was worth £3800. The plaintiffs said it was of a much larger value; between £4000 or £5000. That was a matter to be ascertained, if the court decided that the plaintiffs were entitled to a decree. They had a very large plant, and employed altogether about 300 men constantly on the works. The works were going on in a satisfactory manner, and were expected to be finished in the course of a month. The plaintiffs estimated at that time that £16,000 would complete them, and the agents of the defendants estimated that they would cost £17,000; so that there was a slight difference between them. Possession of the plant being thus summarily taken, it was no longer to be their own property, and complaints were immediately made, and those complaints were embodied in a letter stated in the bill, and addressed by the plaintiffs to the defendants. If they had submitted to the decision of Mr. Hawksley under the circumstances it would have been an act of folly on the part of the plaintiffs. The plaintiffs wrote a letter to the defendants on the 6th of March, to which no reply was received, acknowledging the receipt of a letter from the town-clerk. That letter of the 6th of March that the plaintiffs wrote to the defendants, wishing to submit to arbitration, one would have supposed might have been answered at all events within a week. The plaintiffs gave the defendants ten days to answer without making any further communication. The plaintiffs, of course, in that emergency consulted their solicitors; and, finding there was no answer to the moderate proposal of submitting everything to arbitration, they wrote a letter to the town-clerk on the 16th of March. No reply being given to that, their solicitors wrote again on the 3rd of April without any effect. The contractors were not men overwhelmed with wealth, but men earning their living by the works in which they were engaged, and they said they were entitled to at least £26,000. It was no trivial thing, under such circumstances, to be kept from the 6th of March, when they made the proposal to submit everything to arbitration, down to the 3rd of April, when they wrote the second and last letter, without any reply, asking whether the corporation would submit or not. What were they to do in that position? They felt then perfectly certain that money was coming to them. If they had agreed to an action at law, such a thing would have been ridiculous; for no sooner would the leading counsel have attempted to open his case than it would have been referred to arbitration. The principle of the contract was, that if the contract was determined, the contractors were to be paid for the work done up to the period of the determination. The works were, no doubt, to be completed, and the price of such completion was to be deducted from the amount of the contract. Mr. Hawksley made no certificate, and the question, after all, was whether the plaintiffs were bound to submit to the decision of Mr. Hawksley. He (Mr. Malins) supposed it would be said on the part of the corporation, who seemed so afraid of having the rights decided by anybody except their chosen agent, Mr. Hawksley, that this tribunal had nothing to do with such matters, and that the plaintiff ought to have gone to a court of law. The course of business was, that the plaintiffs were entitled to receive 80 per cent. on the amount of the work that was done. When they wanted money, say in the month of August, 1853, assuming they were entitled to £3000 or £4000 for the work done, they sent in an account of what had been done, and stated at the same time that they would be glad to receive that amount. Mr. Hawksley thereupon made reports, which he sent to the corporation, stating that they had done so much, the number of men employed, the amount of work done, and the quantity of excavation; but the only formal certificate was the award of January, 1853. It was undisputed that there was an award on the 19th of January, 1853, for work done up to the 4th of November, 1852; and a receipt was given by the plaintiffs on the 14th of February, 1853, on being paid the balance due on that award, after deducting 20 per cent. In the answer of the corporation it was stated that, after the date of the said award, large sums of money were paid to the plaintiffs on the recommendation of Mr. Hawksley, and not by way of certificate, up to April, 1854, when the accounts between the corporation and the plaintiffs were again referred to Mr. Hawksley, in pursuance of the terms of the specification, by a resolution of the water committee; and on the 24th, 25th, and 27th of April Mr. Hawksley proceeded to arbitrate on the accounts, and was attended by the plaintiffs. That was the plaintiffs' statement. They said they wanted so much money, and would ask the corporation to pay them. Then they said no award had been made in pursuance of the reference of 1854, and the corporation said it was because the plaintiffs refused to produce their books. The plaintiffs said, on the contrary, that when they produced their books Mr. Hawksley said he did not attend to contractors' books, because they were easily cooked. The corporation repudiated the only thing the plaintiffs were able to show. Cases like the present had been of frequent occurrence. There was the case of *Macintosh v. the Great Western Railway Company*. The plaintiffs desired to have an account, to ascertain the amount due to them for the work they had done. There were only three courses open to them—first, an action at law; that the plaintiffs thought they were not bound to have recourse to. Secondly, private arbitration; that they had offered, and that had been refused. The last and the only one, therefore, was to apply for the decree of the court, which was armed with ample machinery to work out the rights of both parties, and which the plaintiffs had every reason to believe they would obtain.

THURSDAY, DEC. 3.

Mr. BACON, Q.C., (with whom were Mr. KNOWLES, Q.C., and Mr. MILLWARD, of the common law bar,) and Mr. ROWCLIFFE appeared for the defendants, and said the ground upon which he resisted the claim now set up was that the plaintiffs had not, at the time the bill was filed, any right of suit whatever in the Court of Chancery or any other court, because they had by the contract agreed that all questions which should arise under the contract should be settled in a certain manner, at a certain time, and under certain conditions; the time having arrived, and the conditions having been performed. The court would not understand him as saying that it was in the power of anybody to oust the jurisdiction of a court of law or equity, but, in the matter of civil contracts between parties, it was competent for them so to contract; and they had in the present case so contracted. If the bill could be sustained on the ground of fraud, he did not dispute that the plaintiffs might be entitled to relief; but there was no ground whatever for a case of fraud, and such a case had not even been opened on the present occasion, though partiality and vexatious conduct on the part of Mr. Hawksley had been hinted at. Evidence of fraud did not exist, and if the court were satisfied that there was no foundation for the charge of fraud which was introduced into the bill the contract must prevail, and the parties must be regulated entirely by that contract. The corporation of Liverpool were under Acts of Parliament which authorized and directed them to perform certain large works for the benefit of the community among whom they resided—works of great magnitude and great cost, requiring very great circumspection and care in the preparation of the plans, and requiring as a matter of necessity, when the plans were once arranged and determined, that the mode of executing them should be provided with equal care and circumspection. That was what the corporation did. They selected a person who was confessedly one of the ablest persons that could have been selected for the purpose—a person whose reputation for scientific skill was very well known. They knew the end to be accomplished, but they knew that in arriving at that end a great variety of accidents might happen, inseparable from the execution of such works; and they therefore provided the instrument, a contract, by which they endeavoured as far as possible to exclude litigation or dispute—to take care that the works should be executed in a manner satisfactory to them, according to the plan which they had laid down, and, at the same time, containing provisions which should entitle the contractor, whoever he might be, to all that he could fairly and reasonably require. The suits with the Great Western Railway Company had taught all the world interested in such-like works the necessity of being extremely careful to avoid litigation, which might last for years, and which would add greatly to the expenses. The specification, therefore, was drawn with great care, by which the corporation determined that some person nominated by themselves should be the sole arbitrator upon all matters of difference which should arise during the execution of the contract—all demands that the contractors can have to make against them—all the liabilities that they should be under towards the contractors. No one could say that that was not a laudable object on the part of the corporation. They would have neglected their duty if they had not done that. The persons who tendered for the works knew very well who Mr. Hawksley was, and if they did not they were content to take the person nominated by the corporation on all questions that might arise. Was it competent to a contractor, having thus an opportunity of inspecting the drawings and plans, going over the ground, reading the specification, and knowing every term by which he was bound, at any time afterwards to say that he stood in a different position from any other person under the obligations of a contract; that he had a right to play fast and loose with it; and that he had a right to ask the court to relieve him from its obligations, when he had agreed in the most solemn manner that no court of law should be applied to, but that the arbitration of a person named should determine all questions between himself and the corporation? In the absence of fraud, there was no ground or principle upon which the court could say, if a legal contract had been entered into, that all questions should be referred to a certain arbitrator, that it should be in the power of the parties to that contract to retire from that important stipulation in it, and say, notwithstanding they had so agreed, they rescind the contract to that extent, and desire to take the judgment of the court. If it were so, it was utterly in vain for corporations to trouble themselves about such matters; the contract would be waste paper and a mockery; the contractor was not bound at all; and they who could not faithfully discharge their duties unless they did bind the contractor were to be told it was in vain for them to enter into such contracts; because it was at the will of the contractor to go on under the contract as long as he thought fit, and, when he chose to pick a quarrel, or do something which made it necessary for the other party to put an end to the contract, to say he was perfectly free, and he would either bring an action for work and labour done, or file a bill in a court of equity to have the account taken in the judge's chambers, and the decision should be there what he was entitled to. If that was the law, he did not see how it was possible for a corporation ever to enter on the execution of any such works as those involved in the present case, because they would be entirely at the mercy of the contractor. The corporation were very desirous not to have dealings with any persons not duly qualified to execute the works; and in the advertisement for tenders it was requested that no person would propose to undertake the works unless he had had experience in similar undertakings; and thus they took every precaution which prudent men could take. Complaint had been made that the corporation did not deliver a portion of the land by the time specified; but it would be shown that they had done so as soon as they were able, and ample time had been allowed for any delay in that respect. It was said that the contractors applied for an extension of time, and that this was refused, whereas the evidence proved that the time was extended more than twelve months, and that Mr. Hawksley verbally and in writing admitted that the plaintiffs were entitled to such extension. The next complaint was as to the changes in the plans; and the next the refusal to grant certificates. Both these complaints were fully met; and it was proved that, so far from there being any refusal to grant certificates, a demand had never

been made, so that refusal was altogether out of the question. In April 1854, Mr. Hawksley was ready and willing to go into the whole matter; but he required the production of certain vouchers, which production was refused, in consequence of which refusal the meeting which was held was adjourned. The plaintiffs, therefore, having contracted to submit all matters to the arbitration of Mr. Hawksley, and he being willing at all times to arbitrate upon proper materials, if no fraud was shown, as indeed none was attempted to be shown, the plaintiffs had made out no case for the relief which they asked.

Mr. HAWKINS then rose to address the court on behalf of Mr. Hawksley, but

The VICE-CHANCELLOR intimated that no case had been made requiring an answer from Mr. Hawksley.

Mr. HAWKINS stated that Mr. Hawkeley wished the court to understand that he was quite ready to proceed to arbitrate upon the matters in dispute, and to make his award within a week, if the court thought fit.

Mr. MALINS then proceeded to reply upon the whole case, and had not concluded when the court rose.

FRIDAY, DEC. 4.

Mr. MALINS having concluded his reply, their lordships reserved their judgment.

SATURDAY, DEC. 12.

Mr. Justice Erle delivered his judgment on the legal question involved in the case, viz., as to the right of the plaintiffs to recover, under the circumstances, at law on the contract.

Mr. Justice ERLE: To the question of his honour, the Vice-Chancellor, whether, upon the terms of the contract and the evidence of the course of conduct of the parties to the contract in regard to the execution of the works, the case is one in which, if tried at law, the jury would be directed to find a verdict for the plaintiffs, my answer is in the negative. I think there is no evidence to support a claim by the plaintiffs to recover anything in respect either of the work done and the materials supplied before the 28th of February, 1855, or of the plant taken by the defendants on that day, when the contract was lawfully determined. The question refers to the contract and to the course of conduct to the parties thereto; and I would propose to consider, first, the rights under the contract, and, secondly, the effect of the conduct of the parties. By the contract, it appears to me that the engineer is interposed between the corporation and the contractors, and made the absolute judge of the performance of the works, and that there is no right in the contractors to demand payment, and no liability on the corporation to pay, throughout the contract, unless the condition of obtaining a valuation by the engineer and his certificate has been fulfilled. I pass over with the mere mention the clauses giving to the engineer his powers in respect of the works, such as the absolute discretion over alterations and additions, and the valuations of them, and the powers to inspect and reject materials and workmanship, and to suspend or delay the progress of any part of the works, and to settle about the extension of time; and I come to the clauses regulating the contractors' right to demand payment. The parties provide, first, for paying instalments during the progress of the works and the balance on the final completion; and, secondly, for compensating for the work and the plant taken, in case the contract should be terminated before completion. In the first case, that is, if the works progress to completion, then the stipulation for the certificate is express. In paragraph 34, it is provided "That no sum or sums of money shall be considered to be due and owing, nor shall the contractors make any claim against or demand upon the said corporation for or on account of any work executed by them, unless the said engineer shall certify the amount thereof, and that the said contractors are reasonably entitled to such instalment or balance respectively." This clause comprises every right to payment, except in case of termination of the contract, and makes every right universally conditional upon obtaining the engineer's certificate. Then, with respect to the clauses for determining the contract, in paragraph 33 it is provided "That, if the contractors should not, in the opinion and according to the determination of the engineer, exercise due diligence as there described, the corporation may determine the contract, and enter on the works, and take possession of the plant of the contractors as the absolute property of the corporation." Then follows the express provision defining the rights of the parties in respect of such work and such plant:—"When the contract shall have been so terminated, or as soon thereafter as the engineer may think convenient, the engineer shall fix and determine what amount, if any, is reasonably earned by the contractors in respect to work actually done, and in respect to the value of any materials, implements, and tools (that is plant) provided by the contractors and taken to by the corporation; and the amount thereof, after allowing for all sums then already paid to the contractors, shall remain in the hands of the corporation until twelve months after the date of the engineer's certificate of the final completion of the works; and the engineer may, by his certificate, authorize deductions therefrom for losses and forfeitures." Thus the contractors stipulate that the corporation shall be liable only to the amount which the engineer shall fix for work done and plant taken at the termination of the contract; liable, therefore, to nothing until an amount is so fixed, and then only subject to the term for the deductions and the delay above specified. The contract gave to the corporation the right to terminate, and made it liable to make the payments in the manner specified. The contract also made the contractors liable to such a termination, and gave to them the right to the payments in the manner specified. The contract expressly defines the rights of the parties in the event that has happened, and the law can only enforce rights under a contract according to that contract. It is not necessary to cite authorities on such a point. I refer only to some of those cited in the argument. In *Grafton v. Eastern Counties Railway Company* (8 Exch.) the contract was to deliver to the satisfaction of the agent of the defendants. It was held that the promise was on condition that the agent was satisfied, and that no action lay for the price of the coke unless the condition were fulfilled. So in *Milner v. Field* (8 Exch. 589) the same point prevailed. In *Ranger v. Great Western Railway Company* (5 House of Lords Cases, 73) the stipulation that the engineer should be the absolute judge during the progress of the works of the mode in which the contractor was discharging his duties was recognized both as valid and reasonable, though the engineer was a shareholder in the company; and, in pp. 106, 107, the notion that accounts of the work done under a similar contract to this might be taken by the Master in Chancery instead of the engineer, on the ground that the contract had been abandoned, was repudiated as erroneous. The stipulation is of great importance, for, if the contractors can open this contract on account of alterations and additions with mutual disputes, and can insist that an account should now be taken before a stranger of the entire works, which can ill be examined after completion, they may inflict litigation complicated, expensive, and doubtful in the extreme, an evil which the stipulation is framed to avert. The question remains, whether the conduct of the parties affords any evidence of a right of action, either on the ground of waiving the conditions, or of departing from the original contract and substituting another, either expressed or implied, or on the ground of a wrong. My answer is in the negative. I am not aware that the defendants are shown to have committed any wrong, or any breach of their contract, or any departure from it. The complaints of the plaintiffs against the engineer in respect of the extension of the time and of vexatious delays, and of withholding certificates for payment and the like, relate all of them to matters left to the discretion of the engineer by the contract, and if the engineer was unsatisfactory to the plaintiffs it was no breach of contract. At the same time it should be observed that the evidence on the other side is at least equally strong to show that the plaintiffs were wanting in ability for the contract, and that the engineer did his duty to the corporation in resisting them. I take the result of the evidence to be that the engineer was and is able and willing to do all the duties imposed on him by the contract and not incapacitated by collusion, corruption, or otherwise. It is possible that the plaintiffs object to his arbitration because he knows the truth, and would decide according to it; but be this as it may, I cannot discover that the corporation have, by their conduct, created a liability at law not imposed on them by the terms of the contract. My answer thus far rests on the contract to pay being conditional, and is entirely independent of the clause for referring all disputes and differences to the final arbitration of the engineer. If the defendants resorted to that clause, it appears to me to express an intention both to refer to the engineer the matters there mentioned and to exclude other tribunals; and, although there are cases against giving effect to the latter part of such an intention, yet later decisions have limited that doctrine. In *Scott v. Avery* (5 House of Lords Cases) such a reference was held to bind to the extent of the instrument then in question. In *Lillington v. Ralli* (Q. B.) an action was maintained for refusing to fulfil such an agreement to refer. These decisions are an authority for holding that an agreement to refer a question of amount and to exclude the jurisdiction of the ordinary tribunals till the award should be made would be valid. Now, the question between these parties is a question of amount; that is, of the amount due for works and materials and plant, the plaintiffs wishing to have that amount ascertained by a court, the defendants by the arbitrator named in the contract. I therefore incline to think that the defendants could, if necessary, make a further valid defence to an action for this amount in the arbitration clause.

The VICE-CHANCELLOR said he desired to express his obligations to Mr. Justice Erle for the great assistance he had given him by his able judgment he had just delivered, and which satisfied him (the Vice-Chancellor) that the plaintiffs had no right to recover at law; but that left untouched the more embarrassing question whether they were entitled to relief in a court of equity, and on this question he must reserve his judgment.

Miscellaneous News.

THE METROPOLITAN GAS QUESTION.

ADJOURNED MEETING OF THE REPRESENTATIVES OF THE VARIOUS DISTRICTS.

The Adjourned Meeting of the Deputies from the various Metropolitan Vestries and District Boards on the subject of the gas question, and the recent districting of the gas companies, was held at the Marylebone Court House on Wednesday last, the 16th instant.

Dr. BACHHOFFNER again presided, and the conference was very fully attended. The parishes and districts represented were the following:—

MARYLEBONE—Dr. Bachhoffner, Mr. D'Iffanger, jun., Mr. Wingfield, Mr. Cole, Mr. Moore, Mr. Freeth, Mr. Hendry, Mr. Head, Mr. Tavener, Mr. Smy, Mr. Hattersley, Mr. Belton, and Mr. Hodges.

ST. PANCRAS—Mr. Farrer, Mr. Eldridge, Mr. Cameron, Mr. Sandys, and Mr. Austen, accompanied by Mr. W. B. Scott (chief surveyor).

ISLINGTON—Mr. Elt, Mr. Grant, Mr. Collingridge, Mr. James, with Mr. Berry (chief clerk).

ST. JAMES'S—Mr. Geesin and Mr. Beale.

WESTMINSTER DISTRICT BOARD—Mr. Hughes and Mr. Clarke, with Mr. Jebb (clerk).

HOLBORN DISTRICT BOARD—Mr. Hopwood and Mr. Mayes.

ST. MARTIN'S-IN-THE-FIELDS—Mr. Lamb, Mr Soames, and Mr. Tempeny.

WANDSWORTH DISTRICT BOARD—Mr. Jackson and Mr. Reynolds.

FULHAM—Mr. Panter.

HAMMERSMITH—Mr. Fitchew.

PADDINGTON—Mr. Dickson, Mr. Langham, and Mr. Roache.

STRAND DISTRICT BOARD—Mr. Walker, Mr. Carr, and Mr. Jeffries, with Mr. Fry (surveyor).

HACKNEY—Mr. Matson, Mr. Dennis, Mr. Ellis Clarke, and Mr. Wood.

LAMBETH.—Mr. Jeffree and Mr. Shalten, attended by Mr. Warren (assistant clerk).

CAMBERWELL—Mr. Godden, Mr. Kintrea, Mr. Smith, and Mr. Neats, with Mr. Reynolds (vestry-clerk).

LIMEHOUSE—Mr. Skillett, Mr. Nathan, and Mr. Sutton.

NEWINGTON BUTTS—Mr. Redfern, Mr. Holland, Mr. Jones, and Mr. Price.

CLERKENWELL—Mr. Phillips and Mr. Eustace, with Mr. Paget (vestry-clerk).

HAMLET OF MILE-END OLD TOWN—Mr. Hollingsworth and Mr. Leatherdale.

Mr. BEAUMONT stated that he attended on behalf of the Surrey Gas Consumers' Association; and he handed a letter to the chairman which he desired to be read at the proper time.

Dr. BACHHOFFNER, having taken the chair, said: We have assembled pursuant to adjournment to discuss a very important question; but before we go into that, there is a communication to read from the Equitable Gas Company in respect to observations made by a gentleman, a delegate from St. Martin's, at our last meeting. I have no doubt most of you have received a copy of a paper devoted to gas companies' interests called the *Gas and Water Times*, which makes, I think, a most violent and unwarrantable attack, not only upon the gentleman from St. Martin's, but upon the delegates generally; but we can, I think, well afford to put up with abuse coming from such a quarter—(Hear, hear)—Mr. Greenwell will, however, read the letter and correspondence which have been forwarded to him by the secretary of the Equitable Gas Company. (Hear, hear.)

Mr. GREENWELL then read the following communication from Mr. Andrews, with the correspondence accompanying it, between that gentleman, on behalf of the Equitable Company, and the vestry of St. Martin:—

The Equitable Gaslight Company's Offices,
No. 21, John Street, Adelphi, Dec. 15, 1857.

London Gas Monopoly—Important Adjourned Meeting of the Metropolitan Delegates.

Dear Sir,—Under the above heading, a statement appeared in the *Morning Advertiser* of the 3rd inst., and other newspapers, publishing the proceedings of a meeting held at the Marylebone Court House on the 2nd inst., on the alleged gas monopoly, in which it is stated that—

"Mr. Petter (St. Martin's) said, in consequence of this change, the Equitable Company had taken up their abode in St. Martin's, and the result was, that instead of having to pay three guineas per light, they had been raised to £4. 5s. ("Oh,

oh!" and "Shame.") The company had refused to take the contract for more than one year, and then only on condition that they were at liberty to break up the streets when they liked, without consulting the parochial authorities. This was one effect of the abolition of competition in St. Martin's. (Hear, hear.) There could be no doubt that the entire object of the gas companies was to advance their price. (Hear, hear.) Although he would vote for the resolution, he thought an appeal to the Government would not be so effective as a union of the parishes to supply themselves."

As this statement is a series of untruths, so far as this company is concerned, I feel I have no alternative but to request the favour of your reading to the delegates at their adjourned meeting to-morrow a copy of my tender to the vestry of St. Martin, and the subsequent correspondence with the vestry-clerk relating thereto, and which I herewith enclose, from which it will be seen that instead of £4. 5s. per lamp, as stated by the veracious Mr. Petter, our present contract is £3. 10s. per lamp consuming 4 feet of gas per hour.

I am desirous of being as brief as possible, with the view of not unnecessarily occupying the time of the delegates, and will merely observe—

The Equitable Company have lighted St Martin's parish upwards of 25 years: the Equitable Company have had the contract for the public lamps the greater part of that period.

Their last contract was for 3-feet burners, and for a light equal to 5½ candles, for which they received £3 per lamp.

Their present contract is for 4-feet burners, or for a light equal to 8 candles, for £3. 10s., being an increase of 50 per cent. of light for an increase of cost of about 16 per cent.

A large proportion of the lamps, during our late contract, was lighted by another company, and to them £4 per lamp was paid; they are now included in our contract for £3. 10s., and the parish, of course, are saving 10s. per lamp on that number.

A sincere conviction that the delegates' meeting at the Marylebone Court House to discuss this question is prompted from a desire to elicit truth and mete out justice to the gas companies as well as to protect the interest of their respective fellow-parishioners, is the only apology I can offer for trespassing so heavily on your time and that of the meeeting. I am, dear Sir, yours very truly,

SAMUEL ANDREWS, Sec.

To W. E. Greenwell, Esq., Vestry-Clerk, St. Marylebone.

(Copy.)

The Equitable Gaslight Company's Office,
No. 21, John Street, Adelphi, Aug. 20, 1857.

TO THE VESTRY OF ST. MARTIN'S-IN-THE-FIELDS.

Gentlemen,—In conformity with the desire expressed in your advertisement in the *Morning Advertiser* of the 12th of August inst., to receive proposals or tenders for lighting with gas the public lamps in your parish, in the most effectual and economical manner, for the term of three years from Michaelmas next, I am instructed by the board of directors of this company to tender for lighting the whole of the lamps now in use, and such additional ones as may be hereafter erected in your parish, for the above period of three years from Michaelmas next, at the following prices per annum, viz.:—

For each batswing or other usual description of burner not consuming more than 4 feet per hour £3 10
Ditto, ditto, 5 feet per hour £4 0

to include the lighting, cleaning, painting, and ordinary repairs.

Respectfully hoping the above proposals will meet with your approval and be accepted, I am, Gentlemen, your most obedient servant,

(Signed) SAMUEL ANDREWS, Secretary.

(Copy.)

St. Martin's-in-the-Fields Vestry House, Aug. 27, 1857.

Gentlemen,—I am directed by the vestry of St. Martin to inform you that your tender for lighting the public street lamps of their parish, at the rate of £3. 10s. per annum, for each burner consuming not more than 4 feet of gas per hour, including cleaning, painting, and keeping in repair the columns and lamps, has been accepted by the vestry for one year from Michaelmas next, the lamps throughout the parish to be uniform, and supplied with 4-feet burners. I will therefore prepare and send you a draft contract. I am, Gentlemen, your obedient servant,

(Signed) J. DANGERFIELD, Vestry-Clerk.

To the Equitable Gas Company,
21, John Street, Adelphi.

(Copy.)

The Equitable Gaslight Company's Office.
No. 21, John Street, Adelphi, Aug. 28, 1857.

Sir,—I am this instant in receipt of your favour of yesterday's date, informing me that this company's tender for lighting the street lamps of this parish, for 4-feet burners, at £3. 10s. each, has been accepted by the vestry for one year.

I beg to remind you that your advertisement and my tender stipulated for three years, and I am not authorised to accept a contract for a shorter term. I will, however, submit your letter to my board on Tuesday next.

I am, Sir, your obedient servant,

To J. Dangerfield, Esq., St. Martin's Vestry. (Signed) SAMUEL ANDREWS, Secretary.

(Copy.)

London, 26, Craven Street, Charing Cross, Sept. 2, 1857.

ST. MARTIN'S CONTRACT.

Dear Sir,—I am favoured by yours of the 28th ultimo.

Please say, by bearer, whether I am to draw your draft contract for one year.

Yours faithfully,

Samuel Andrews, Esq. J. DANGERFIELD.

(Copy.)

The Equitable Gaslight Company's Office,
No. 21, John Street, Adelphi, Sept. 2, 1857.

ST. MARTIN'S CONTRACT FOR LIGHTING.

Sir,—Your letter of the 27th ultimo, informing me of the vestry's acceptance for one year of this company's tender to light the lamps of your parish, has been laid before my board, and I am instructed to state that the directors do not object to take the contract for one year, although their tender was based, in accordance with the advertisement, upon your usual term of three years.

I am instructed further to inform you that my board objects to incur any expense for a contract for the limited term of one year, and suggest for your consideration whether an endorsement on the existing contract would not meet the views of your vestry. If you concur in this, and will let me have for perusal a draft of the endorsement, I will return it without delay.

I am, Sir, your obedient servant,

To J. Dangerfield, Esq., 26, Craven Street. (Signed) SAMUEL ANDREWS, Secretary.

(Copy.)

St. Martin's-in-the-Fields Vestry House, Sept. 11, 1857.

ST. MARTIN'S VESTRY AND EQUITABLE GAS COMPANY.

Dear Sir,—In reference to your letter of the 2nd instant, stating that the Equitable Gas Company objects to incur any expense for a contract for the limited term of one year, and suggesting an endorsement might be made on the old contract of the terms of the new arrangement, I beg to inform you that, the old contract being made with the paving committee, now no longer in existence, it has been deemed advisable to have a new contract, which I have accordingly prepared, and enclose the draft for your perusal.

The vestry, I believe, will pay their own expenses attending the contract.

I am, dear Sir, yours faithfully,

H. HUMPHREY.

S. Andrews, Esq., Equitable Gas Company, Adelphi. Signed for J. DANGERFIELD, Vestry-Clerk.

Mr. THOMAS C. LAMB said, as one of the delegates from St. Martin's-in-the-Fields, he had to express his regret that his friend Mr. Petter was not present, on account of a very severe domestic affliction. (Hear, hear.) He had, however, seen Mr. Petter, and that gentleman had informed him that a very grand mistake had been made, and that he did not intend that the remarks he had made to apply to the Equitable Company. He (Mr. Lamb) was authorized on behalf of Mr. Petter, in justice to the delegates generally and in justice to the vestry of St. Martin, begged to take that, the first opportunity which had been offered, of putting the matter right, and of amply, he hoped, apologizing for the error, at the same time disclaiming all intention of wilfully perverting the facts. Under these circumstances, he trusted that the apology would be accepted by all parties. (Hear.)

The CHAIRMAN said: Having settled this matter, we will proceed to the adjourned discussion on the resolution supported by Mr. Beale at the last meeting, and which, I believe, every metropolitan vestry and district board has had the opportunity of discussing.

Mr. KINTREA would propose that the resolutions should be discussed *seriatim*, as he had great objection to the third resolution

Mr. REDFERN seconded the motion, and it was carried.

Mr. FITCHEW (Hammersmith) had been a gas director, and must say that he thought Marylebone had but little to complain of with regard to the price of their public lights. So far from being extravagant, the price the vestry of Marylebone pay for their public lights does not pay for its manufacture. I am not a gas director now, but I was so formerly, and I know something about it. The gas companies do not get any profit out of the public lights, but they are compelled to light them in order that they may be able to make their profit out of the private consumer. (Hear.) My own impression is, that if we go to the gas companies, we shall find them ready and willing in the main to fall in with our views. ("No, no," and "Hear, hear.") I think you are, at all events, much better off here in Marylebone than we are at Fulham and Hammersmith, for we, in some districts, are called upon to pay as much as £5. 16s. per light. I think, under all the circumstances, that a conference with the gas companies will be a step in the right direction, and that we shall find that they will not object to meet us fairly in any reasonable demands—(Question)—and he thought that the third resolution was the most valuable amongst them. ("Hear, hear," and "Oh, oh!")

The CHAIRMAN would remind the honourable gentleman that they were not now discussing the third resolution. The debate had been adjourned on the first resolution, which he would read, and if no one had any observation to offer upon that, he would then call upon Mr. Freeth, as its mover, to reply. It was as follows:—"That it is desirable that the metropolitan parishes should concur in a united application to Parliament by petition, or on the motion of the metropolitan members, for a committee of inquiry into the existing arrangements for the supply of gas to the metropolis."

Mr. FREETH would not have felt it necessary to have said one word in reply, had it not been for the publication of one of the greatest libels on a body of gentlemen in the thing before him, called the *Gas and Water Times*. (Hear, hear.) When he looked round that room, and saw it completely filled by independent gentlemen, representing most of the metropolitan parishes—gentlemen who, like himself, had no object on earth to serve by coming there but the benefit of the ratepayers—were they to put up with impunity with the foul slander of this *Gas and Water Times*, "that they were a set of unscrupulous or ill-informed parish agitators?" ("Hear, hear," and "Shame.") Were they, the representatives of hundreds and thousands of ratepayers in the metropolis, to put up tamely with this insult from the organ of these monopolizing gas companies—("Hear, hear," and "Oh, oh!")—and take no notice of it? Were it an independent public journal who said this, the case might be different; but it was from the organ, the paid creature of the gas companies. It was a journal which told them on its face what it was; namely, a paper for the promotion of the interests of the shareholders of gas companies. He gave these gas journalists the lie direct, when they said that they, the representatives of the metropolis, were unscrupulous—on the contrary, it was the gas companies who were unscrupulous. (Hear, hear.) What had brought that vast assembly there that day but the unscrupulous conduct of the gas companies in their attempts at monopoly? (Hear.) Was it because the gas companies had acted fairly, and had done their duty to the public that they were there? They were placed at the mercy of monopolists; and because they were determined to relieve themselves of the monopolists, or bring them to a sense of their duty between man and man, they were to be called by the organ of the monopolizing gas companies "unscrupulous or ignorant parish agitators." Had the gas companies come forward when they made this re-arrangement, and parcelled out the metropolis into districts, and said to the representatives of the parishes and the consumers—"Now, gentlemen, we have done this as a mere matter of economy, and we are prepared to give you a guarantee that you shall not suffer—that we will not raise the price of your gas beyond 4s. 6d. per 1000—that we will not increase the price of your public lights, and there shall be no diminution in the illuminating power of your gas." Then, had we made charges, and taken this step against the companies, they might have justly called the delegates "unscrupulous agitators." But when the companies had done nothing of the sort; when they had, on the contrary, shown their intentions, this vituperation only had the effect of showing the metropolitan boards that they must go on with this movement, and he had no doubt whatever that Parliament would fully and cheerfully aid them. (Hear, hear.)

The first resolution was carried unanimously.

Mr. BEALE moved the second resolution—"That a committee of one representative of each district be appointed to prepare such petition, and that the vestry of St. Marylebone be requested to communicate the same to all other parishes, and solicit the affixing of the common seal of each vestry or district board to such petition, and that the same be entrusted to the respective borough members for Parliament."

Mr. GEESIN (from St. James's) seconded the resolution.

Mr. KINTREA would suggest that the words, "and that the vestry of St. Marylebone be requested to communicate the same to other parishes," be left out. For himself he had not the slightest objection that the vestry of Marylebone should do this; but he regretted to find that it begot a feeling of jealousy, most unwarranted, for they were deeply indebted to that parish for having taken the initiative in so important a matter—(loud cries of "Hear, hear")—and therefore he thought it would be better if the words, "the committee," were substituted for "the vestry of Marylebone." His reason for this was, that one gentleman who took an active part at their last meeting had taken umbrage, and had unfortunately so much influence over his board as to persuade them that this was a movement on the part of Marylebone—in fact, it was all Marylebone, and nothing else—and the consequence was, that they had most absurdly withdrawn their deputation.

The CHAIRMAN wished to know—and he had no doubt the gentlemen present would also like to hear—the name of the individual who had so wrong an impression upon his mind as to take such a step as that described. (Hear, hear.)

Mr. KINTREA had no objection to name the gentleman: it was Mr. Newman, of St. Saviour's, Southwark, who certainly had every opportunity of expressing his own opinion at their last meeting. (Hear, hear.) Under these circumstances he would appeal to Mr. Beale to substitute the words, "by the

committee," instead of "by the Marylebone vestry," in the resolution. ("Hear, hear," and "No, no.")

The CHAIRMAN: I am quite sure I am expressing the opinions and feelings of my colleagues in Marylebone when I say that, for ourselves, we most cordially concur in the views of Mr. Kintrea. I am really astounded how a gentleman of Mr. Newman's capacity could so have become mystified in the matter. We—the vestry of Marylebone—had no object whatever but the public good in commencing this movement. (Loud cries of "Hear, hear.") We have, I think, proved that we did not wish to make this gas question an isolated Marylebone question, by inviting you all here. In all cases like this there must be some one to take the initiative; and, as Marylebone did so, we could do no other than we have done. (Hear, hear.)

Mr. BEALE could not consent to the alteration suggested by his friend Mr. Kintrea, although he was much astonished at the course adopted by Mr. Newman. Let it be borne in mind that Marylebone had all the machinery, and were they to give up a point and abandon the parish by which they had been called into creation simply to gratify whims or crotchets of one particular gentleman? (Hear, hear.)

Mr. FREETH would, in the first place, impress upon the meeting that if they left this in the hands of a committee they would have to find their own funds, and be each individually liable. In the metropolis there were 46 districts, and Marylebone paid 1-12th part of the rates. As it was, therefore, in that respect the number one parish, he thought there ought to be no objection to let Marylebone take the number one position. He could not, of course, speak of some of the economists in the Marylebone vestry, but he thought that there would be no difficulty in their vestry putting down £50 in aid of this movement, in the same manner as the parish of Hampstead had nobly advanced £200 for the preservation of Hampstead Heath by a bill in Parliament.

Mr. ELT must support the original proposition, for if left to themselves some board would become lukewarm, and if they felt a danger of having to pay money some might withdraw their deputation. He did not mean to say that the metropolitan parishes would not pay their proportion towards expenses, but such might be the case if there were a committee alone to deal with.

Mr. GEESIN said it was not his intention at all to have spoken but for the turn this subject had taken. It was true that the parish of St. James was in an independent position with regard to this gas question, but he must say that the parish of Marylebone did them great honour to call them together rather than otherwise. (Hear, hear.) As to the trash in that paper referred to by Mr. Freeth, he treated it as the idle wind that blows. Only attempt to attack monopoly, and a man is denounced as a demagogue, as a destructionist, and all other ill-natured epithets were applied to him. Although, therefore, the parish of St. James were free and independent at that moment, a day might come when they would be oppressed by these gas companies unless they made a stand against it. (Hear.) It was their duty therefore to lay aside any petty jealousies like this over-the-water gentleman appeared to possess, and nip this monopoly in the bud, and tell the gas companies that which they did not mean to stand. ("Hear, hear," and laughter.) Marylebone had always been foremost, and let it hold its place now. (Hear, hear.) As to the individual from Southwark, he (Mr. Geesin) would have thought he knew better. (Hear, hear.) If they could bring their southern friend a little more north, they would soon make him a little more knowing. (Cheers and laughter.)

Mr. TAVENER said as he read the second resolution, it really gave no power to Marylebone except this: that a committee was to be appointed, to prepare a petition, selected from that meeting—a member from each and every parish and district being on that committee; and that then Marylebone was only to communicate the petition when so drawn to other parishes. (Hear, hear.) Let every parish and district board be represented in that committee: for his own part, he hoped there would not be one left out.

Mr. KINTREA wished to observe that he thought every parish in the metropolis was deeply indebted to Marylebone for what it had done. (Hear, hear) His only reason for the suggestion was what he had stated.

Mr. JACKSON was at first inclined to support Mr. Kintrea's view, but after what he had heard, that Marylebone was inclined to pay the shot, he had no objection that Marylebone should take the lead.

The CHAIRMAN did not think he would be doing his duty as a vestryman of Marylebone if he allowed gentlemen to believe that they were so Quixotic as to tilt the windmill without aid from any other quarter. (Hear, hear.) He had no doubt the vestry would come forward with what was required, but he could not answer for public boards, which, as it was said, had not a soul to be saved or anything else. (A laugh) He had no doubt, however, that the other parishes would contribute each their fair quarter towards any expenses that might be incurred. (Hear, hear.)

Mr. MATSON: The resolution is so plain, I am sure, that there can be no mistake in the matter.

The resolution was then put and carried unanimously.

Mr. BEALE would now move the third resolution, which was a very important one, although he had strong intimation that it would be likely to lead to discussion. He had no desire to multiply gas companies, but his impression was that the arrangements which had recently been entered into were of a character that they would, if they did not at present, act as a monopoly speedily. He had no objection whatever to the gas companies economizing and making one horse or one man do the work of four, but he wanted a guarantee for himself and the public that, in doing this, they should not augment their price, but that they should keep up their quality and give good meterage. What he wanted was that they, the representatives of the parishes, should have a conference with the directors of the gas companies, and say to them, "Will you meet us upon fair ground and talk over the matter? If your object is not monopoly, show it to us: let us have powers of control not only to test the quantity, but the quality of your gas, and then you must guarantee to keep it at a maximum price." If we make this application to the gas companies, and they refuse to meet us, then it would materially benefit the position of the parishes in going to Parliament. They would be able to show that the present acts of these companies were a gross violation of the principles of free trade, and that the directors were determined to maintain monopoly. It would place the gas companies in the wrong if they did not consent to meet them. (Hear, hear) His resolution was, "That it is desirable that a communication be made by the metropolitan vestries to the various gas companies supplying the ratepayers and their districts, seeking their co-operation in an appeal to Parliament, to fix a maximum price for the supply of gas; and that to that end the directors of the various gas companies be invited to meet the representatives of the metropolitan parishes."

Mr. BELTON seconded the resolution. With regard to this question of the amalgamation of the companies, it was quite clear to him that competition had failed. (Hear.) If they had competition for a time, it ultimately got bought up, and the companies amalgamated in such a way, which was entirely at variance with the principles of free trade. One gentleman had told them that day that the price charged for the public lights of Marylebone did not pay for the cost of the manufacture of the gas they consumed. Now, he (Mr. Belton) had made some calculations on that point, and he found that the public lights were charged in Marylebone at the rate of 3s. 6d. per 1000 feet, and, seeing that the cost of gas was only 1s. 9d. per 1000 feet, ready for distribution, there was at that rate 75 per cent. profit.

The CHAIRMAN called Mr. Belton to order. He was not speaking to the question as to whether they should ask for a conference of these respective gas companies.

Mr. FITCHEW must correct the statements made by the last speaker, lest the gentlemen present should be lead to erroneous conclusions. The contract with the Great Central Gas Consumers' Company, it was true, was for 1s. 9d., but there were many other contingent expenses, and it was a fact that litigation was going on between the contractor and the Great Central Company for thousands of pounds. One of the greatest expenses consisted in leakage. (Cries of "Question.")

The CHAIRMAN also called Mr. Fitchew to order.

Mr. HUGHES (Westminster) said the resolution, to his mind, did not go far enough. It went to tell the gas companies that they required gas to be supplied at a maximum charge, and there it stopped; but he thought that they ought to tell these gas companies that they wanted more control over them than they had at present. There were some very useful provisions in the Gas-Works Clauses Act, but, unfortunately, the metropolitan gas companies did not come under those clauses. He believed that, if either of the London gas companies went to Parliament for fresh powers, that the Parliament placed the restrictions contained in these useful clauses upon them; but, knowing this, they took care to avoid going to Parliament. There were also very valuable restrictive clauses placed on the water companies by the Water-Works Act of 1852, which controlled the quality of the water; and what they wanted was the same powers with regard to gas. Considering the resolution did not go far enough, he would submit as an amendment, after the words, "maximum charge for the supply of gas," "and to subject the gas companies to the operation of the Gas-Works Clauses Act, and to such other provisions for the protection of the consumers as may be deemed necessary."

Mr. HOLLINGSWORTH (Mile-End Old Town) would second this amendment. The metropolitan gas companies ought never to have been exempt from the restrictions and control given over them by these clauses, and would not have been but for the supineness and lukewarmness of the public themselves. (Hear, hear.)

Mr. CAMERON (of St. Pancras) thought it was desirable that no more errors should go forward upon that question, emanating from that meeting; and therefore he rose to correct a statement that no metropolitan company had become subjected to the Gas-Works Clauses Act. He begged to say that the Imperial Gas Company went to Parliament in 1854 for an alteration of their powers, and were subjected to those clauses; and not only that, but they were limited to a maximum price for their gas to 6s. per 1000 cubic feet, and were also specially precluded, by a clause in their Act, from compelling an in-coming tenant to discharge the gas debt of a previous tenant before they lay in another supply. (Hear, hear.)

Mr. REYNOLDS (Wandsworth) also considered the motion did not go far enough, if they were to go to the gas companies at all. The fixing a maximum price for gas would be no advantage, unless the question of quality was also combined with it. (Hear, hear.) He thought, instead of going to the companies fettered or restricted, the question of the supply of gas ought to be entirely open. There were a variety of questions, and not the least important was the fact that, although the parishes and districts paid for a supply of gas to all their public lights, it was astonishing the number of lights reported by the police as not being lighted at all, from various causes.

Mr. BEALE thought that if he adopted these words after the words, "to fix a maximum charge for the supply of gas," it would meet the views of the mover and seconder of the amendment, viz., "and to make other necessary provisions for the protection of the public." (Hear, hear.)

Mr. BEAUMONT, on behalf of the Surrey Gas Consumers' Association, said experience had taught them on the Surrey side of the water that you could not depend upon the promises of the gas directors. The only plan was to have a staff to test the quality and quantity of their gas continually, and publicly expose it.

Mr. FREETH could not agree at all with Mr. Beale's third resolution to go to the gas companies. (Loud cries of "Hear, hear.") Let it be borne in mind that the companies were directly antagonistic to those of the representatives of the public—(hear)—and as to asking them to join them in going to Parliament to restrict them in charging a maximum rate for their gas, depend upon it that the gas companies would not abandon the advantage they possessed till they were compelled to do so. If he wanted an evidence of this he need only to read an extract from that pretty specimen of scurrility, the *Gas and Water Times*. That exponent of the views of the monopolizing gas companies—what did it say in reference to the maximum price of the Imperial Company being at 6s. per 1000 feet? Here was a nice admission on the part of that most "unscrupulous organ of the gas companies:"—"Notwithstanding the talk that is made of the Imperial being bound down to a maximum rate, it is felt and acknowledged on all hands, that, were a great strait to occur, the company might abandon a district, and leave it in darkness, unless a remunerative price were offered by consumers, in the shape of premium or other seductive operation." ("Hear, hear," and cries of "Shame.") So this "unscrupulous point held out a threat that, although an Act of Parliament fixed the maximum price at 6s., to be charged by the Imperial Company, still that such company might be 'unscrupulous' enough to evade and set aside their Act of Parliament by leaving a district in utter darkness, unless the consumers chose to offer them a remunerative price, in the shape of premium or other seductive operation." Now, here was a nice little piece of information for the metropolitan delegates to lay before Parliament. Its meaning was unmistakable; and with such a declaration coming from such a quarter, could it be believed that they would effect any good by having a conference with the gas directors. (Hear, hear.) His advice, therefore, was to go to Parliament and to the Secretary of State at once, and keep entirely aloof from the gas companies. By adopting that course they would find that the directors would come to them, instead of them going to the directors. (Hear, hear.) Under all the circumstances, he would urge upon his friend Mr. Beale the withdrawal of his third clause altogether, and go at once to the fourth resolution, which would follow naturally the first and second, which had been passed. (Hear, hear)

Mr. Hughes and Mr. Hollingsworth withdrew their amendment, as Mr. Beale's alteration in the original motion met their views.

Mr. PANTER (Fulham): The gentleman who had opposed the motion al-

together had anticipated, to a great extent, his views. The question was, should they go to war with their hands tied? That would certainly be the case if they adopted the resolution. (Hear, hear.) In the parish of Fulham they had different demands for the supply of gas. In some parts they paid but 4s. 6d. per 1000 feet; but in another they were charged the sum of £6. 15s. each public light. ("Hear, hear," and "Shame.") It was not so much for the gas that this apparently very high charge was made; it was for the mains they had to lay. It was very different in Marylebone, where they had mains in every street; but when they laid their mains over a mile sometimes without a private light, they made the high charge of £6. 15s. as an equivalent for their outlay.

Mr. FARRER considered if the public had a right they ought to maintain it, and not allow it to be frittered away by gas companies, or any other companies. They were battling against monopoly, and he hoped they would persevere in the struggle till they came off victorious.

A DELEGATE (understood from Newington) said he had the misfortune to live in a district which had been divided, and the result was, that they did not get half the light, in consequence of the depreciation in the quality of the gas, they did formerly, when they had competition. He had to pay a great deal more money for a much worse gas. (Hear, hear.) Their medical officer tested the gas, and the company offered that he should test it at the works, and he did so, and found it very good; but he subsequently tested it at the church at which he attended, and found it quite a different article.

Mr. HATTERSLEY said it was impossible to fix the maximum price for gas without reference to its quality, and he proposed to go into the details of that question, but several members thought that the details upon such a point would be more a subject for committee, and Mr. Hattersley, seeing the feeling of the meeting, gave way.

Mr. KINTREA agreed that to fix a maximum price for gas regard must, at the same time, be had to quality and the price of coal. Under all the circumstances, he agreed with Mr. Freeth, and would urge upon Mr. Beale to withdraw the motion altogether. (Hear, hear.)

Mr. WALKER (St. Paul's, Covent Garden) was so convinced of the impolicy of the third resolution, that he would at once move as an amendment, that they proceed to the fourth resolution, and not pass the third resolution at all. (Hear, hear.) It was perfectly absurd for them to think of having an interview with these gas monopolists at all. It would be far better to go down to Sir George Grey at once in a body, and ask him to bring in a measure to enable the boards of the metropolis to give it to the public at a cheap rate, and appropriate the profits to the improvement of the metropolis. (Hear.) Why, he would ask, should they be pandering to the monopolists? (Hear, hear.)

Mr. JEFFRIES (Strand) said he would second his colleague's amendment. He looked upon it as a perfect waste of time to be holding a conference with the directors of the gas companies; even if they accepted the offer, which he very much doubted, depend upon it the conference would end in nothing. (Hear, hear.)

Mr. GODDEN (Camberwell) thought the meeting would do right in supporting the amendment rather than the original motion. If they asked the directors of these gas companies to grant them this conference, the inference which would be drawn would be, that they, the representatives of the parishes, were weak, and the directors strong. Let the directors of the companies therefore take the initiative. (Hear, hear.) He firmly believed that by unanimity they, the representatives of the metropolitan vestries and district boards, were sufficiently strong to put the screw upon the gas companies, as much or more severely than the gas companies could put the screw upon them. (Hear, hear.) It was not at all likely that the gas companies would themselves become parties to putting an end to their own monopoly—(Hear, hear)—and, speaking of "monopoly," there was one word in reference to that point in the fourth resolution, and that was the word "contemplated," which he (Mr. Godden) disagreed with. It was not a "contemplated monopoly," but a "monopoly" already in action. (Hear, hear.) It was not at all likely that any good would result from this conference between the delegates and the gas directors, and therefore he would urge upon their friend, Mr. Beale, the withdrawal of his resolution. (Hear, hear.)

Mr. CLARKE (Westminster) considered that the public and consumers had already been subjected to too much shearing, like sheep, to permit themselves to be sheared still closer by the gas companies. It would be perfectly ridiculous to go to the gas companies for any aid. (Hear.) The district board which he represented had recently had a specimen of the fairness of these gas companies. They found out that one of the adjoining parishes was being supplied by the Chartered Company at a less price than their own, and upon applying to the Chartered Company for an explanation they sent a letter, of which he held a copy in his hand. It was dated "Chartered Gas Company, Horseferry Road, Westminster," and was to the following effect, and addressed to their clerk:—

> Although the inquiry you make is such as is most unusual to give information upon, the directors have authorized me to reply with regard to the difference between their tender for lighting another parish and that of your board. Amongst other reasons which might be adduced, we are rated much higher in this than the other parish. I am, sir, your obedient servant, C. BURLS, Secretary.

(Roars of laughter, and cries of "Shame.") So that, in consequence of the poverty-stricken character of the one parish, which compelled a somewhat higher rating than an adjoining one, and which pressed equally upon all the ratepayers, this Chartered Company charged a higher price, to put the money into their own pockets, thus making the burthen still heavier for all the other ratepayers. (Hear, hear.) It was the determination of these grasping monopolists to exact the utmost farthing, and therefore what good could be effected from a conference with the parties? It would be derogatory to the public character of the parish of Marylebone and to the parishes generally were they to do so. He should therefore, unless No. 3 resolution was withdrawn, vote for Mr. Walker's amendment.

Mr. SKILLETT (Limehouse) thought that if his friend Mr. Beale would withdraw his third resolution, and fall back upon the fourth, it would be more satisfactory. They were there on that occasion for the benefit of the ratepayers, and ought not to suffer themselves to be hampered by any arrangement with gas companies. (Hear, hear.)

Mr. SANDYS (St. Pancras) would, on the part of himself and colleagues from St. Pancras, strenuously urge Mr. Beale to withdraw the third, and fall back on the fourth resolution. (Hear.) He had consulted his four colleagues there that day, and they were all of opinion that it would be impolitic to confer with the gas companies. He trusted, therefore, that Mr. Beale would withdraw his motion. (Hear, hear.)

Mr. GEESIN regretted to say he felt it his duty to oppose the resolution of his colleague Mr. Beale. (Hear, hear.) It was a false move to go to the gas companies to ask them what they were prepared to give them. He (Mr. Geesin) thought that the question was, what they—the representatives and the consumers—were going to stand. (Cheers and laughter.) He liked sometimes to go to Home Secretaries—(laughter)—especially when they had a good case, as they had on this gas question—(Hear, hear)—and he hoped there was not a parish which would not be represented when they did so, but that they should go up to Sir George Grey in a compact body. It was their duty to stand firm against this monopoly, and enter into no compromise whatever with the gas companies. If they did, they would damage themselves. (Hear, hear.)

Mr. FITCHEW differed from the last gentleman. He thought they would go with a much better tale to the Home Secretary if they first conferred with the gas companies, and more especially if they refused to give them any redress. It must, however, be borne in mind that gas companies had not been paying the heavy dividends to their shareholders which had been represented. (Hear.) Although formerly a director and a shareholder of a gas company, he begged to assure them he never received more than 6 per cent. (Cries of "With a bonus.") No, without a bonus. Let them first go to the gas companies. He thought the companies would meet them fairly, but, if they did not, then go to Parliament the more vigorous and determined, and in that he would be ready to aid them and pay his proportion of expense. (Hear, hear.)

Mr. F. JONES (of Newington) considered they had already been sufficiently at the mercy of the gas companies, and knew too well what their promises were, to trust them again. He would strenuously urge the withdrawal of the resolution. (Loud cries of "Hear, hear.")

Mr. WINGFIELD (Marylebone) was as much opposed to the monopolizing gas companies as any man in that room, but, before they went to Parliament or the Home Secretary, he would have a conference with the directors, and give them one more chance. ("No, no," and cries of "Withdraw.")

Mr. BEALE, in reply, said, with regard to the fourth resolution, he had only intended it as a *dernier resort* in the event of the gas companies refusing to meet them in a fair and proper spirit. If they went to the Home Secretary without being able to tell him what gas companies would do or what they would not do, he might tell them that they had no case for a parliamentary committee of inquiry, where they must meet these gas directors face to face. He was not going to quote, as some gentlemen had done from the scurrilous *Gas and Water Times*, but he held in his hand a journal which he believed to be the real exponent of the feeling and opinions of the great majority of the metropolitan gas companies, and that was, the JOURNAL OF GAS LIGHTING, WATER SUPPLY, AND SANITARY IMPROVEMENT. That journal, instead of indulging in abuse, positively invited and advised the gas directors to take that course which his (Mr. Beale's) motion suggested they should do. (Hear, hear.) He was still of opinion that they would have an advantage before Parliament, if compelled to go there, in being able to show that the gas directors had put themselves in the wrong. At the same time, out of deference to the strongly-expressed opinion from all quarters in that meeting, he would, with the consent of his seconder, withdraw the third resolution.

Mr. BELTON assented, and both the resolution and Mr. WALKER's amendment were withdrawn.

Mr. BEALE moved the fourth resolution, which, after some suggestions from Mr. KINTREA to withdraw the word "probable," and substitute the word "existing" for "contemplated" monopoly, the resolution was proposed in the following form:—"That a deputation composed of the representatives present, and such others as may be nominated, do wait upon the Home Secretary (the Members of Parliament for the metropolis being also invited) to represent the evils of the existing monopoly, and to solicit the aid of the Government in protecting the interests of the ratepayers by supporting the proposed committee of inquiry. That a copy of these resolutions be forwarded to each metropolitan member, with a request that he will concur in an arrangement to secure the aid of the Government in granting such committee, and join the proposed deputation to the Home Secretary."

Mr. BELTON also seconded this resolution.

Mr. NATHAN (Limehouse) said it struck him that when they went to the Home Secretary, he would ask them what he could do for them. He thought they should ask the Home Secretary to bring in a bill to give to every vestry and district board a permissive power to erect gas-works and supply their respective districts with gas. (Hear.) If the representative bodies had power to hold this right over the gas companies, they would have very little to fear, either with respect to high charges or a proper illuminating power in the gas.

Mr. HODGES supposed the committee would draw up the petition and submit it to a future meeting, and report generally on their arrangements. (Hear, hear.)

The resolution was then carried unanimously, and the following gentlemen were nominated as the committee, viz.—Dr. Bachhoffner, Mr. Freeth, Mr. Elt, Mr. Hattersley, Mr. Fitchew, Mr. Kintrea, Mr. Skillett, Mr. Petter, Mr. Beale, Mr. Matson, Mr. Carr, Mr. Farrer, Mr. Mayes, Mr. Clarke, Mr. Phillips, Mr. Redfern, Mr. Reynolds, Mr. Hollingsworth, Mr. Cameron, Mr. Roache, and Mr. Walker.

It was then agreed that the committee should meet to draw the petition, make the other arrangements, and report that day fortnight.

Thanks having been awarded to the chairman, the conference terminated their sitting, which lasted upwards of three hours.

THE SUPPLY OF GAS IN MANCHESTER.

DEBATES IN THE CITY COUNCIL ON THE PRICE OF GAS.

At a Meeting of the Council on the 2nd inst. Councillor CURTIS brought forward the motion of which he had given notice—"That the charge for gas supplied to all consumers within the city, from and after the 25th of December next, be fixed at the rate of 4s. 6d. per 1000 cubic feet, subject to such discount to large consumers as may be fixed upon by the gas committee." Mr. Curtis said the total clear profits of the past year were £49,122 upon a return of sales amounting to £127,131, and he contended that was an excessive amount of profit to make. He argued that the present was the most favourable time to make a reduction, and said the time had come when the water-works and improvement committees could afford to stand without assistance from other quarters. After commenting upon the relationship existing between the gas committee and the improvement and water-works committees, he said they were just in a position to pay off the amount due to the improvement committee, and, as to the water-works committee, they should let them down gradually and step by step, until they did not trust to any other resources than their own.

Upon the motion of Alderman CLARK (and with the expressed consent of Alderman Shuttleworth and Mr. Curtis), the further discussion of the subject was adjourned until Wednesday, Dec. 16.

The Adjourned Meeting was held in the Town Hall on the 16th inst., the mayor, IVIE MACKIE, Esq., in the chair. The sitting lasted from half-past ten until two o'clock, and the whole of the time was occupied in the discussion of Mr. Curtis's motion.

Mr. Alderman SHUTTLEWORTH, chairman of the gas committee, resumed the debate. After a few words of commendation as to the manner and tone

in which the subject had been introduced by Mr. Councillor Curtis, he observed that the complication of figures and reasonings adduced by Mr. Curtis appeared to make the conclusions which he strove to establish vague and unintelligible. He then referred to the letter written by Mr. Curtis, in which (said the alderman) he attempted to show that the profits of the gas committee were considerably more than their balance-sheets exhibited, and that the improvement committee could proceed for years to come with all necessary improvements, without deriving one single farthing from the gas profits. Mr. Curtis stated that the available assets amounted to £70,074. One item of this was the estimated value of the land belonging to the improvement committee. Now, everybody knew that land was not property which could fairly be considered available, as in order to dispose of it to advantage opportunities had to be waited for to realize it, and assuredly such opportunities did not constantly occur, and, under the gloom and depression which now surrounded them, they might safely conclude would not be likely to occur at present. Another item of £45,255, put down by Mr. Curtis as available assets, was the debt owing by the gas committee to the improvement committee. The nature of that debt did not appear to be clearly understood. Many years ago the improvements in the town were not carried on with much vigour, and the consequence was that the gas profits which belonged to the improvement committee were not required to be paid over, but were retained by the gas committee and applied to gas purposes until the debt amounted to about £70,000. Such was the condition of the accounts between the two committees when the charter of incorporation was granted. Under the obligations of the charter a different and improved system was introduced, and this debt was fixed at a definite amount. The gas committee had no means of discharging all the debt, and carrying on, at the same time, its important establishment; and it was agreed that the liquidation of this heavy debt should be made by the annual payment of 5 per cent. upon the amount owing. It was no exaggeration to say that this debt, which was now upwards of £45,000, could not, upon the principle fixed upon, be extinguished for the next century; yet Mr. Curtis put that down as available assets. There was another omission which vitiated the view Mr. Curtis had taken. In the first item of the improvement committee's statement of assets and liabilities, Mr. Curtis had taken the items as available liabilities, and the very first item was an item on the other side of the account, for the debts owing by the improvement committee amounted to £126,570, and that item was not in Mr. Curtis's letter, which he supposed had been written deliberately. Was it creditable to put forth such a document? The issue before the council was not to be decided by the amount of profits, but by other considerations. Alderman Shuttleworth then went through an estimate of the condition of the gas establishment in connexion with the other interests concerned. In estimating the profits of the gas establishment, he would take the average of five years. During the last five years the gas committee had had favourable contracts for cannel, which was not likely to occur again. In the first year of these contracts, 1853, the profits were £35,859; in 1854, £35,940; in 1855, £34,496; in 1856, £30,640; and in 1857, £46,772; making a total of £185,407, or an average of £37,000. What was the effect of the temporary advantage they gained from the favourable cannel contracts? During the five years they gained by these favourable contracts £60,000, or an average for each year of £12,000, which, if deducted from the £37,000, left £25,000. Then there would be an increased cost of cannel of £10,000 a year; and there was a certainty of a local rate being imposed next year, which, according to Mr. Ling's estimate, would amount to £3000; and for the same period there would be a loss of interest upon the outlay of capital, not rendered productive, of £1500. These three items made £14,500, which, deducted from £37,000, left £22,500. It was proposed to reduce the price of gas 6d. per 1000 cubic feet. Now, the production of the Manchester gas establishment considerably exceeded 600,000,000; from this something must be deducted for leakage, and something for the use of the public lamps; so that he took it the 600,000,000 might be reduced to 500,000,000. Upon this the reduction of 6d. per 1000 cubic feet would amount to £12,500, half of which would fall upon the improvement committee, and the other half to the water-works. What an effect the abstraction of this sum would have upon the water-rate! A water-rate at 6d. amounted to £14,000; therefore £6250, or the half of £12,500, would require an additional water-rate of 2¾d. in the pound, to make up the sum abstracted from the water revenue. The deficiency in the present water-rate was £24,000, and the gas profit was the only source from which this deficiency could be met; and, supposing the gas profits to remain as they now were, there would be a deficiency in the water-works accounts of £18,000 or £19,000; so that, under any circumstances, there would be a necessity on the part of the water-works committee to have an additional rate, or to meet the deficiency by some new arrangement equivalent to a rate. Whatever the arrangement might be, it would be one that would take the money from the pockets of the ratepayers. There would be a necessity for either a direct new rate of 5d., making the present 6d. rate 11d. in the pound, or there must be some other means of raising the money. It would thus be seen that an 11d. rate might enable the water-works committee to go on, but reduce the gas profits, and the water-rate must be raised to 14d. in the pound. He would put it to the council, if they could go from 6d. to 14d. without producing a feeling which would do the council anything but good in the public estimation? What would be the effect of a reduction upon the improvement committee? That committee was entitled to one-half of the £22,500 estimated profit—he did not think the gas-works next year would do more than this; they would, therefore, receive £11,250, but, deducting half the proposed reduction, which would be £6250, it would leave the improvement committee only £5000. The payments on the debt due would amount to something like £4500, which would make a total of £9500, but from this must be deducted £5700, which the improvement committee paid for their debt of £126,570; this left the balance really available to the improvement committee only £3800, and with that, would the council believe for a moment that that committee would be placed in a condition to liquidate the debt of £126,000 and defray the expenses of the works in progress, to say nothing of other works which the public interests might require to be initiated? Beside these liabilities, it was notorious that there was something "looming in the distance," to which he thought it was not at all necessary more particularly to refer. He thought this statement would satisfy them that the resolution now before the council was, at all events, one that should not be lightly decided, but required the consideration, reflection, and judgment of a very different class of calculators to those who had lately been marshalled before the public in favour of the resolution. It might be said the increased cost of material he had mentioned was not likely to continue, and that it, like materials of ordinary merchandize, was subject to fluctuations. It was true there would be fluctuations in the value of coals, but they would be like the advancing or receding tide, grow larger and larger, and wider and wider. This matter had received his attention for years, and he had noticed a constant increase in the price of coals. In 1827, the production of coals in this kingdom amounted to 22,000,000 tons; in 1856, it had increased to 67,000,000 tons annually—a threefold increase in 29 years. He saw France using an immense quantity of our coals, and relaxing their custom-house regulations so as to admit English coal on more easy terms. There was, in addition, a growing demand from Prussia, Italy, Russia, and the United States, the East and West Indies, China, and from almost every part of the world in which we carry on any trade. And besides all this, our domestic manufactures were increasing rapidly, and there was quite a new world in the demand for coal for our ocean navigation. These facts seriously impressed him with the importance of the gas committee entering into a long and large contract. He brought the matter forward, and proposed that they should contract for seven years, and for 350,000 tons of cannel, whereas they had never before contracted for more than one year and 30,000 tons. The committee, by a large majority, sanctioned the proposal, but there were two gentlemen on the committee who were unwilling to take that course. In deference to their objections, the contract was reduced to five years, and the 350,000 tons to 210,000 tons, the profit was £60,000, and if the original project had been agreed to, it would probably have been £100,000. He had referred to Glasgow when he had spoke before on this subject, and had shown them that they had been charging 4s. 6d. and had issued a notice that they must in future charge 5s. Then they saw London in a state of excitement upon the gas question, and the companies were compelled to resort to increased prices. In one metropolitan parish the increase had been 47 per cent, and yet the company had declined at something like two or three times the price to supply the public lamps in Marylebone. In Chester there were two companies, and they had been making gas at 4s. 6d. per 1000 cubic feet, but could make it no longer at that price; and Mr. Salisbury, the member, who took an interest in the question, had come forward to ask for assistance in getting a bill to raise the price to 5s. The gas at Chester was equal to 14 candles, so that at 5s. it was equal to 7s. 11d. for Manchester gas. The House of Commons had fixed the standard for Cheltenham at 12 candles, and he was told that was the highest quality imposed upon any company by Act of Parliament. He had a remarkable document with reference to the Gas Acts passed last session. Before referring to it, he would explain what was the meaning of the standard of light measured by candles. The mode of indicating the illuminating power was to compare the light given by a burner consuming five cubic feet of gas in an hour with the light given by the consumption of sperm candles of 120 grains per hour. All experiments relating to gas were reduced to that standard. There were 15 Gas Acts passed last session, and the results were as follow:—

Place.	Price per 1000 Cubic Feet.	Illuminating Power in Candles.	Considering the Quality of Manchester Gas, equal to
Sunderland	4s. 0d.	12	7s. 4d.
South Shields	4 6	12	8 3
Burslem	5 0	10	11 0
Bury	5 0	12	9 2
Chepstow	5 0	12	9 2
Stockton (Borough)	5 0	10	11 0
„ (out of Borough)	6 0	10	13 2
Glasgow	5 6	12	10 1
Stratford-on-Avon	5 6	12	10 1
Cork	6 0	10	13 2
Willenhall	6 0	12	11 0
Victoria Company, London	6 0	12	11 0
Shrewsbury (Borough)	6 0	12	11 0
„ (out of Borough)	7 0	12	12 10
Guildford	6 6	12	11 11

There was another Act to make up the number, but he believed that it only referred to the purchase of land, as there was no return as in the other cases. The total result was that the 14 Gas Acts produced £7. 6s. 3d., or an average of 11s. 10½d. per 1000 cubic feet compared with the gas produced at Manchester. He submitted that, in Manchester, where the medium price was 4s. 6d., there were other elements of quality besides superior illuminating power. He agreed with one passage in Mr. Curtis's letter, and that was, that in fixing the price of gas, they ought to act fairly between the owners on the one hand, and the consumers on the other. So far as his long experience in the gas committee enabled him to judge, they had invariably taken the sentiment of that passage as their golden rule. They had sought for every opportunity of reducing the price of gas. From 1825 to 1840, a period of 15 years, they had reduced the price from 14s. per 1000 feet to 7s. 6d., a reduction of 22 per cent.; and after the gas establishment came under the control of the town council, from 1840 to 1850, a period of 10 years, the price was reduced from 7s. 6d. to a medium price of 4s. 6d., which was a reduction of 47 per cent. The charges now imposed upon the gas committee were imposed by a majority of 39 against 5, he being one of the five; and he opposed it because it interfered with that which he felt a pride in doing, coming to the council, and announcing further reductions in the price. They must now not only look to the magnitude of their gas profits, but to the purposes to which they were devoted, and the obligations those profits had to meet. He would absolutely assert the principle that the customers they supplied ought not only to have a good article—the best they could produce—but they should have it at the lowest possible price to which fair and legitimate competition would reduce it, and if they charged one farthing more they did a grievous wrong. He had shown them that if they reduced the price of gas, the inevitable consequence must be an increased water-rate of 2¾d., and they would utterly paralyze, if not destroy, the labours and objects of the improvement committee. He concluded by stating that Manchester gas, estimated in the way he had explained, was equal to 22 candles. The alderman resumed his seat amidst loud cheering, after speaking an hour and three-quarters.

Mr. Alderman Heywood moved, as an amendment upon Mr. Curtis's motion, "That it appears to this council undesirable at present to reduce the price of gas." His mind had been made up for some time. He was as anxious for a reduction in the price of gas as anybody could be, if it were the right time, and their obligations were not such as they were. It was a question of policy with him whether it would be right or just on the part of the council, seeing the obligations they owed, to ignore them. He thought Mr. Curtis would have taken a more common-sense view of the case if he had provided for an increase of the water-rate before attempting to reduce the price of gas.

Mr. Alderman Clark seconded the amendment, and said he thought a more injudicious time for Mr. Curtis's proposal could not possibly have been chosen. They had a vast amount of obligations, the chief security for which was simply the gas-works. They were about to go to Parliament to obtain further power to borrow money to extend the works, and he did not think the adoption of the resolution proposed was the way to make them stand well in the money-market, especially in times like these. That they should, without any well-defined cause, attempt to reduce their legitimate profits

was suicidal. They were trustees of the gas-works, which were the property, not of the city council, but of the ratepayers of the township of Manchester, and it was their business to make the most they could of the trust. The price of gas was now much lower than the average of other towns in the kingdom, and the present obligations were openly contracted with the intention that they should be met by the gas profits; and it was not fair to the ratepayers to turn round upon them, after entering into obligations, and tell them coolly that it would be better for these obligations to be paid out of an improvement and water-rate. He noticed the change which had taken place recently amongst the intelligent portion of his late constituency on this subject. He thought the council were bound to do nothing which would interfere with the credit of the corporation. If they attempted to carry the reduction to the extent which had been talked about, they would find there was a Court of Chancery that had the power and the will to deal with trustees who did not act fairly up to the trusts committed to them. People talked of every tub standing upon its own bottom, but he did not like the idea of emptying the large tub, and depending upon the tubs which had, as the Irishman said, "no bottom at all."

Mr. Councillor T. B. SHARP said in his establishment they paid £900 for gas per year, and when they had candles they paid £2200, with not half so good a light. Though he should like to put £90 a year into his pocket, he did not see how he could vote for a reduction under existing circumstances.

Mr. Councillor GRUNDY said he was as favourable to cheap gaslight as anybody, and would vote for a reduction when a seasonable opportunity occurred, but, looking at the present obligations of the corporation, he must support the amendment.

Mr. Councillor KING thought Mr. Curtis had taken a wrong basis to found his argument upon. He thought they ought not to consider the question of profit or loss, but to consider their position as trustees of the works.

Mr. Councillor DYSON was in favour of "every tub standing upon its own bottom," so that the ratepayers might know exactly what they were paying for. They (the council), at present, could not themselves understand the accounts; therefore he thought they ought to be made out in an intelligible manner. There were 50,000 houses in Manchester still unsupplied with gas, and 250,000 people, a great majority of them were working people, whose efforts made Manchester great. He believed the council had descended from a high position to become mercenary traders; they looked after large profits instead of after the welfare of the people. Their first duty was to supply the inhabitants with good and cheap light, and so they would assist in rendering the homes of the working classes more comfortable. He found from inquiry that Mr. Falkner, of Stephenson's Square (a gentleman he should like to see in the council) paid 3s. in the pound gas rates, while his opposite neighbour, a timber merchant, paid only 2½d. in the pound. George Street paid 2¼d.; Bridgewater Place, 3½d.; High Street, 5d.; Cannon Street, 3¾d.; these were streets where the large warehouses were, and if they went to the streets where the shops were, they would find Oldham Street paid 1s. 1d. in the pound on the assessment; Deansgate, 1s. 3d.; Swan Street, 1s. 3½d.; Great Ancoats Street, 1s. 6d. He believed this was a great injustice, and pressed upon the working classes. He complained of the conflicting interests which arose in committees on account of the existing state of things; in fact, now, one committee boasted of having overturned another, and thus came about the Hulme Street tunnel, and other blunders.

Mr. Councillor SIMPSON, in a long and able speech, defended the proceedings of the gas committee, and replied to the arguments adduced in favour of a reduction. He contended that the committee had acted as faithful trustees, and gave one or two popular illustrations to show that persons in Manchester and the neighbourhood, who had either been manufacturing their own gas or getting it from other sources, had been very glad to come to the corporation and take their gas at 5s. In his own case they had used every appliance science could suggest in the manufacture of gas, and they found they could get it on more advantageous terms from the corporation. The question of the comparative price in different places was illusory, as the article could be supplied at any price; and he contended that the gas supplied in Manchester was the cheapest in the world. He then quoted statistics to show that in Deansgate and the district, for which Mr. Dyson had conceived such an affectionate regard, the proposed reduction would involve the shopkeepers in larger payments than they were now making. In 31 shops, where they now paid £227. 10s. 6d., they would have to pay £239. 10s 3d. if the price of gas was reduced; and in Oxford Street, where they paid £179. 7s. 11d. now, they would have to pay £186. 7s. with a reduction in the price of gas. The total number of gas consumers was 23,714: of these 21,749 were rentals under £10, and of these 10,000 were under £2. The 21,749 produced an aggregate rental of £60,157, or just half the rental, and the remaining 1965 produced a rental of £59,500, and of these 374 produced £32,000 per annum. If the reduction took place, the 21,749 would get the advantage of £6015, and would have to pay in return for it £8155. Mr. Simpson then alluded to the advertisements which had appeared on the subject, replied to the complaints about the gas-meter monopoly of £240 a year, and proceeded to state, in reply to Mr. Dyson, that in 1856, 2735 tenants who pay £1 each took gas, and in 1857, 4735, or more than double; and during the present winter they had sold above 3000 gas-meters of the same size. Adverting to the question of defaulters, he said the returns were unsatisfactory, notwithstanding the precautionary measures that had been taken. In 1851 the bad debts were £32; in 1852, £212; in 1853, £253; in 1854, £531; in 1855, £667; in 1856, £466; and in 1857, £688; and they were largely increasing. The council had borrowed more than £2,000,000 and he was afraid that would not be the ultimate sum. They had now arrived at a time when their credit was worth something, and they ought not to paralyze the committees that had yet large sums to borrow.

Mr. Councillor BENNETT wished to know why the consumers in Manchester were charged as much for their gas as consumers in the outlying districts, such as Cheadle and Didsbury? and if it was true that the gas committee had laid pipes in the private grounds of Mr. Grant, at Blackley, which Mr. Grant now claimed as his freehold?

Mr. Councillor CRASTON thought they ought to have gas as cheap in Manchester as in Salford, and instanced Bradford as a town where gas was supplied at 4s. per 1000 cubic feet, of 17 and 19 sperm candles illuminating power.

Mr. Alderman BANCROFT said, if the council could not, as Mr. Dyson had said, understand their accounts—if they were in such a deplorable state of ignorance—a resolution had better be proposed to disperse the council and get another body. Mr. Bancroft briefly replied to Mr. Bennett by saying that he supposed the pipes were laid to the outlying districts to meet the wants of the increasing population; and with regard to Mr. Grant's case, his agent was willing to have the pipes laid through the ground; but when the work was done, Mr. Grant came forward and repudiated the acts of his agent.

Mr. Councillor JOSEPH LAMB spoke briefly in justification of the proceedings of the gas committee, and in favour of the amendment.

Mr. Councillor CURTIS replied at some length in an able speech, again controverting the data upon which Mr. Alderman Shuttleworth had based his arguments. He also replied to the observations of Messrs. Heywood, Simpson, and Bancroft, and said the public out of doors would not be satisfied until this question was settled. He was glad the amendment had been moved in the shape in which it appeared, and not as a direct negative; as, if it was carried, it would encourage the public out of doors to go on with the agitation. Having contended that it had been proved that the gas committee were receiving now more than fair and legitimate profits, he mentioned that he had received a memorial from a public meeting of ratepayers; but, as it was ruled that it would be out of order to present it, it was not presented.

Mr. Alderman BANCROFT wished Alderman Heywood to withdraw his amendment, to allow a direct negative to be moved, but he would not consent.

Upon a vote being taken, the amendment was carried by 37 votes against 14. The majority consisted of Messrs. Watkins, Nicholls, Goadsby, Aspden, Slater, Simpson, Clark, Walker, Grave, Heywood, Fletcher, Willert, Shuttleworth, Rawson, Hetherington, J. Lamb, Grundy, King, Bake, Rumney, Green, Ryder, Howarth, Robinson, Sharp, Crewdson, Williams, W. H. Lamb, Ellis, Parnell, Newton, Dearden, Nall, Pilling, Neild, and Sir J. Potter. Against the amendment there appeared Messrs. M'Gill, Craston, Woodward, Dyson, Leigh, Pratt, M'Connell, Brougham, Howard, Curtis, Jones, Pellett, M'Dougall, and Worthington.

GENERAL CONSIDERATIONS ON THE MATERIALS EMPLOYED IN BUILDINGS ERECTED IN SEA-WATER.

(*Continued from page 459.*)

The action of the salts of magnesia is more rapid, and might prove more dangerous; its effect is, in fact, to produce, by double decomposition, aluminate of magnesia and sulphate of lime. So long as this last is dissolved as fast as it is produced, the danger is not great, because the aluminate of magnesia would to a certain degree replace that of lime, and thus produce only a momentary diminution in the solidity. If, on the contrary, the aluminate be irregularly distributed or concentrated in certain parts, the double decomposition above mentioned might be attended with the crystallization of the sulphate of lime, and thus produce a swelling.

We cannot affirm that the silicate of lime would be decomposed by the salts of magnesia, inasmuch as the greater affinity of the silica for the magnesia and of the sulphuric acid for the lime, are the principal sources of this double decomposition. The affinity of the silica for magnesia is not so great as that of alumina. It follows, then, that the highly injurious action of the salts of magnesia would be directed principally to those hydraulic limes which contain alumina in large proportion; and that it would be much diminished, perhaps altogether disappear, in limes exclusively siliceous.

Carbonic acid acts in like manner, first on the free lime, then on the aluminate, and lastly on the silicate. It produces only carbonate of lime; but, this compound being pulverulent, cannot restore the solidity destroyed in its formation. Thus, carbonic acid infallibly produces disintegration, when the mortar is so porous as to permit the frequent renewing of the sea-water. Sulphuretted hydrogen acts in the same manner, and its action is still more injurious, as it is produced in the sea under irregular conditions; and may, in certain instances, give rise, by the momentary or periodical admission of atmospheric air, to the crystallization of the sulphate of lime, and consequently to a swelling or scaling off of the mortar.

CASE 2.—The lime, being in excess, compared with the carbonic acid contained in the sea-water, the solidified mortar would contain free lime near its surface. Part of this would be gradually carbonized, but another part would be dissolved, and consequently the mortar would by degrees become porous. The sea-water would thus gradually penetrate into the inner substance of the mortar, and then the actions already described would take effect.

From the above-mentioned facts we conclude as follows: Mortars composed of hydraulic lime and sand can only give favourable results in cases where the precautions observed in their preparation and application render them almost impermeable after setting. Some of these precautions are essentially practical; whilst others, on the contrary, relate to the composition of the lime employed, and the proportion of carbonic acid and sulphuretted hydrogen contained in the sea-water. The lime might, and ought, to be in an excess proportioned to the abundance of the carbonic acid and sulphuretted hydrogen. We can only succeed in determining the most suitable excess of lime in any particular instance by comparison with other carefully-observed cases, in which the mortar is confessedly durable.

The action of the salts of magnesia contained in sea-water would be very injurious, and it is principally confined to mortar made with aluminous lime. Their action on mortars made with siliceous limes would be little or nothing.

The great difference in the employment of mortar in fresh and sea-water may be traced to numerous causes: first of all, to the more violent motion and rapid periodical variations in the pressure caused by the waves and tides; next, and perhaps mainly, to the more complicated and more energetic chemical actions, of which no precise account has yet been given. The action of the salts of magnesia is certainly very great; but it is not the most important, because it is of the same nature as that of the water alone, and may be counteracted by the universal adoption of those precautions which have given successful results in any one locality.

The most dangerous actions are those which vary from port to port, and obtain sufficient time for their development, by the retardation in the setting produced by the chloride of sodium. Such are those of the carbonic acid and sulphuretted hydrogen, which are very variable in proportion, and require an excess of lime in proportion to their quantity, in order to ensure a complete and durable setting. This is the main difficulty in the employment of mortars in marine works.

The cements which contain a small excess of lime give somewhat different results, but are subject to the same chemical actions of the water, the carbonic acid, the sulphuretted hydrogen, and the salts of magnesia. During the generally short interval which precedes the setting, a small portion of the free lime is carried off; at the moment of setting the contraction is more or less energetic, as the sand is in greater or less proportion. It forces the lime towards the surface, where the carbonic acid of the water rapidly transforms it into the carbonate. It is, consequently, much more easy to obtain, by the use of cements, constructions almost impermeable, and in which the chemical actions would consequently be scarcely perceptible. The precautions indispensable during their preparation and application are those designed to secure the attainment of a degree of contraction during the setting sufficient to impart a close texture to the cement. Where the cement is permeable, the actions of the salts of magnesia, carbonic acid, and sulphuretted hydrogen, would be more energetic than in mortar, because they operate almost directly on the active combinations of the lime.

These considerations should be added to those already pointed out whilst examining the action of water alone, and which are applicable to constructions in fresh water in the same degree as to those in sea-water.

§ 5. *Examination of the Results obtained in the Analyses of Limestones, Hydraulic Limes, Cements, Mortars, and Puzzuolanos.*

We will now examine the analytical results contained in the tables A, B, C, D, and E:—

Table A.—*Hydraulic Limestones.*—The first part of this table contains the analyses of several specimens of the limestones of Theil *. The different beds contain, in intimate union with the limestone, a tolerably large proportion of fine-grained quartzose sand, and a very small quantity of clay; alumina is only found in inappreciable quantities in the hydraulic limes of Theil, and consequently the product of the calcination of these limestones may be considered as siliceous lime.

The mixture of the sand is not homogeneous in all the beds. In the Alignole quarry the upper and middle lines present considerable variations in the samples taken from the north and south, while the lower beds appeared to be more homogeneous.

The proportion of sand ranges from 10 to 17 per cent. of the limestone, and consequently very different hydraulic results would be obtained. It is, therefore, important to know from which bed and from which quarry of the Theil limestone is derived the lime which is to be employed in marine works. It is very difficult to ascertain with certainty which are the beds producing the most highly esteemed limes; but it seems to result, from the particulars we have collected, that they are precisely those which are the most homogeneous and contain the finest sand, but not in the greatest proportion. This practical result might be easily explained in a theoretical point of view, but we are not sufficiently assured of the reputation acquired by certain beds to insist farther on this subject.

The limestones of Fécamp *, the analyses of which are detailed in the second portion of the same table, were taken by M. Chatoney from successive beds, many of which might be easily worked. They contain a tolerably intimate mixture of clay and a very small quantity of sand. In this respect they differ materially from the limestones of Theil, which contain but very little clay.

The beds, Nos. 1, 2, and 3, contain far too small a proportion of clay and sand for the production of hydraulic lime. They might easily be employed for the manufacture of artificial lime, in every respect similar to that of Theil, by mixing intimately with them about 10 or 12 per cent. of finely-ground silica, moulding the substance into bricks, and subjecting it to ordinary calcination.

We have commenced a series of experiments, with a view to the practical verification of this theoretical proposition, the results of which will be given in the second part of our notice.

The beds, Nos. 4, 5, 6, and 7, in like manner, would not yield lime possessing any great hydraulic energy, even supposing them to be very homogeneous. They contain too much clay to permit us to obtain artificial lime similar to that of Theil, but they may be very usefully employed in the manufacture of artificial cements like the Portland. This result might be obtained by mixing these limestones very closely with 12 or 15 per cent. of clay, or by combining 1 part of them with 1½ part of the limestones 9 and 10. In both cases the calcination should be continued until the angles of the bricks begin to run.

We should also certainly obtain a very good artificial hydraulic lime by mixing the limestone with 10 or 12 per cent. of powdered silex, and exposing the mixture to a moderate calcination.

The bed, No. 8, might yield a natural hydraulic lime of small energy, but this would be considerably augmented by the admixture of from 5 to 8 per cent. of powdered silex, according to the nature of the materials; or else by employing, with the lime procured directly from the stone, a slightly argillaceous sand.

In all these modes of manufacture we must take into account the possible heterogeneity of the bed, and assure ourselves by more extended analysis that the proportion of sand and clay remains sensibly the same in the various parts of the deposit. In cases where the proportion is variable, it would be necessary to ensure homogeneity by grinding; and, in this state, the mixture of 5 or 8 per cent. of powdered silex might be conveniently effected.

The beds, Nos. 9 and 10, contain a sufficiently large proportion of sand and clay to induce us to expect the production of cement by properly conducted calcination. We must not, however, be too hasty in deciding on this subject, because the qualities of the product obtained by calcination depend principally on the closeness and homogeneity of the mixture of limestone, clay, and sand. These two conditions can only be established by the examination of a great number of samples, and after a certain extent of the deposit has been laid open.

We have dwelt upon the various methods of making use of the Fécamp limestones, because at present this question possesses great importance in connexion with the works proposed to be executed at Hâvre. The cliffs which stretch along the entire coast contain all the materials necessary for the manufacture of hydraulic limes and cements, clay, silex, and beds of limestone ready mixed with different proportions of fine sand and clay.

There is still required a methodical examination of all the points of the coasts, in order to decide upon the most convenient situation for an extensive manufacture, and also the collection of a great number of samples, representing the composition of all the beds that could be profitably worked; the analyses of these samples will point out the beds to which a preference should be given, and also the mixtures it would be necessary to make previous to calcination.

We should then erect in the neighbourhood of the works an establishment in which the silica and the limestone would be ground and intimately mixed. These two operations require peculiar and carefully-arranged apparatus. No expense, no precaution should be spared in the pursuit of the required object—perfect intimacy and homogeneity of the composition before calcination; for the good qualities of the product depend very mainly, if not altogether, on the observance of these conditions. Furnaces, such as are in common use, would be required for the calcination, which should be kept at a moderate temperature for hydraulic limes and quick-setting cements, and at a higher temperature for cements of a similar nature to the Portland.

No doubt an establishment of such magnitude would involve very great expense, and the prices of lime and cements would be much advanced at first; but we repeat that true economy does not consist in the use of materials which cost but a small sum per yard cube, but rather in the use of such as are well ascertained to be of good and durable quality, and which alone can ensure the permanency of constructions.

We have, moreover, reason to hope, while looking at the extensive works projected or in course of execution in the ports of the Channel, that the State, which is at present dependent on private enterprise, either native or foreign, would realize a considerable saving in expense by the formation of such an establishment.

The analyses of the ten specimens of the marls of Vitry le Français* give a large proportion of clay in intimate combination, and readily accessible to the humid agency. At the same time they show that the different parts of the deposit are dissimilar in composition, and that it would therefore be necessary to observe great precaution both in manufacture and application, in order to secure homogeneous products.

Experience has already shown us that the cements of Vitry le Français set very rapidly; but they have not yet been used, at least as far as we know, in marine construction. They are employed very successfully in moulding sculptured ornaments.

Table B.—*Limes and Cements.*—We have selected for our examples of the hydraulic limes those which are produced from the burning of the Theil and Graville* limestones. The former contain only an extremely small proportion of alumina; in the latter, on the contrary, the alumina, although small in quantity, is in fair proportion to the silica.

Specimens Nos. 1, 2, 3, and 4 of the Theil lime represent the products of the calcination, after exposure for a certain time to the air. This fact is placed beyond doubt by the remarkable proportion of water contained in them, and which certainly would not be found at the time when it was taken from the furnace; it is therefore doubtful whether the carbonic acid indicated by the analysis arises from imperfect calcination: it may have been at least partially absorbed by the atmosphere. Nevertheless, the specimen No. 1, which represents the powdered core, contains a much larger proportion of carbonic acid than the other three, in which the quantity of water is nearly the same.

This observation warrants the conclusion that the core owes its peculiar properties to a less advanced degree of calcination, but which is sufficient to produce a complete action of the quartzose sand upon the lime. It consequently possesses the remarkable advantage of containing as much silicate of lime and less free lime than the more highly burned portions. We might also remark that the silicate of lime of the core would combine more easily with water, on account of the more moderate temperature to which it had been exposed. In pursuance of this opinion, we are led to conclude that the cores should be used by themselves, and should not be mixed with more highly burned lime. The mixture would, in fact, contain silicates of lime, unequally burned, and possessing different degrees of affinity for water. It is to be feared that these irregularities would produce defects in the setting, and that the solidity of the mortar would be thereby injuriously affected †.

These irregularities might, moreover, completely disappear, by reason of the very gradual setting of the mortars made with the Theil lime; and the foregoing remarks may be considered merely as a precautionary suggestion.

In specimens Nos. 1, 2, and 3, which are of good quality, and represent very fairly the materials successfully employed at Marseilles, Algiers, and other parts of the Mediterranean, the proportion of alumina is inappreciable, and the hydraulic properties are solely attributable to the silicate of lime. The silica is nearly one-third in weight of the lime; and, consequently, the product of the calcination of the Theil limestone would consist of a mixture of silicate of lime, susceptible of hydration, with an excess of caustic lime, which last might be injurious in waters only slightly charged with carbonic acid.

The specimen No. 4, sent from Theil to Hâvre for the purpose of experiment, contains a proportion of silica sensibly smaller than that of Nos. 1, 2, and 3, and evidently does not come from the same beds. The enormous excess of free lime it contains, when mixed with the active silicate of lime, would have an unfavourable effect on the success of the experimental mortars, which would be the more injurious as the waters of the Channel, containing less carbonic acid than the waters of the Mediterranean at Marseilles, require hydraulic limes containing a much larger proportion of caustic lime.

The analyses of the limes of Graville, near Hâvre, are confined to the two principal beds which are in a condition to be worked. The first bed produces lime closely resembling that of Theil, with this difference, that a certain proportion of aluminate is substituted for the silicate of lime; the second bed does not contain a quantity of clay sufficient to allow the product of the calcination to be employed alone in the preparation of hydraulic mortars. The comparison of the analyses (Nos. 6 and 7) which relate to the ordinary and the prolonged calcinations of the limestone of the bed No. 2, would lead us to conclude that there is no need of raising the temperature to a high degree in order to effect the combination of the alumina and silica with the lime. In ordinary calcination, the coarse-grained sand would simply remain in an inactive state.

The consequences of this observation possess great importance, not only as regards the lime from the bed No. 2, but also from No. 1. This last possesses very considerable hydraulic energy, but it only produces good mortar when mixed with sand containing a certain proportion of clay,—part of the free lime would then act on the silica and alumina of the clay, and so form,

* The limestone beds from which the Theil, the Fécamp, the Vitry le Français, the Hêve, and the Grasville limes are obtained, are all members of the cretaceous series, and are known by continental geologists under the general name of the *craie glauconieuse*. Careful researches upon the outcrop of the chalk marl in our own country would, no doubt, lead to the discovery of materials of equal value; and, indeed, Smeaton (p. 116 of his work, already quoted) expressly calls attention to the "Sussex clunch" and to the grey limes of the northern and southern outcrops of the chalk marl of the South Downs.—G. R. B.

* See note to previous column.

† Much has been said of late respecting the hydraulic properties of subcarbonate of lime, and various examples of marine construction have been adduced, which have stood perfectly well for several years, made with lime imperfectly burned, and, moreover, containing a large quantity of carbonic acid. The setting has been attributed to the hydration of a subcarbonate of lime, the existence of which is not even suspected in scientific chemistry. We are not acquainted with any well-supported facts which would lead us to admit the existence of such a compound; and we are of opinion that the solidification of the mortar in question may be easily explained by the following considerations:—

The limestone employed might contain a very small proportion of very fine sand or clay. By an imperfect calcination, the lime would lose only a portion of the carbonic acid, but would combine with the silica and the alumina, the presence of which was the principal cause of the decomposition of the carbonate. The lime would consequently contain—silicate and aluminate of lime, a small proportion of caustic lime, and carbonate of lime.

The imperfect calcination was an imperative condition of the hydraulic property; for by leaving a great part of the lime in combination with the carbonic acid, the proportion of caustic lime is reduced within suitable limits as compared with the very small quantity of the silicate and aluminate.

The lime in question would therefore correspond to a mixture of inactive ingredients with a lime remarkably hydraulic. The setting might still take place under favourable conditions.

This explanation could only be set aside by a minute analysis of the subcarbonated limes, showing the total absence of silica; and, even in this case, we should not be in a position to assume the hydraulic properties of the subcarbonate as clearly established, before proving, from analysis, that the mortar contained neither clay, silicate, nor silica, on which the free lime might act in the humid way. In presence of these substances, which are in small proportion as regards the sand employed, and act as puzzuolanos, the imperfect calcination of the limestone may be an indispensable condition of success.

in the humid way, silicate and aluminate of lime, the setting of which might take place at the same time with that of the similar compounds, formed in the dry way, already existing in the lime. The clay in the sand would therefore have the effect of saturating a portion of the lime in the caustic state. The effect produced increases still more the hydraulic energy of the mortar; and, consequently, it only remains for engineers charged with the construction of works to ascertain the most suitable practical conditions, that is to say, the proportion of clay compared with the sand, and the precautions necessary to be observed in the preparation and use of the mortar.

These precautions relate principally to the homogeneity in the setting, and are very simple. The use of the lime from bed No. 1 might be yet more simplified, by conducting the calcination of the limestone slowly, and at so low a temperature that there would still remain a certain proportion of lime in the form of carbonate. By this means, the excess of injurious lime would be diminished, and the setting accelerated; the mortar would contain less of the compounds which are capable of hydration, and which contribute to its solidity,—but the reactions being more simple, the ultimate product would possess greater durability; and the constructions would probably be much more lasting than those in which a mixture of argillaceous sand with well-burned lime was employed.

The second part of Table B contains the analyses of the artificial Portland cements of Messrs. White and Brothers, and of the natural quick-setting cements of Vitry le Français.

Portland cements are exposed to a prolonged calcination at a degree of temperature sufficient to soften the angles of the bricks, and frequently even to effect the complete vitrification of certain proportions. They are imported into France in the form of powder, but not reduced to great fineness. The grains composing the vitrified angles are readily distinguished in the coarser portion: these are separated by sifting, and the fine powder and the sand are used separately, after subjecting this last to a fresh grinding. In some cases, however, the powder is used just as it is imported from England.

The analyses we have made do not define the difference which should exist between the vitrified portions and those which have been less burned; the former would contain a certain proportion of alumina and oxide of iron combined with silica, while the mortar would contain lime, combined respectively (at least for the most part) with the silica and alumina.

The analyses of three specimens, viz., sifted cement, unsifted cement, and the powdered vitrified portion, gave nearly the same results for the proportions, except for the oxide of iron; for this last the results were not quite similar, which seems to indicate that the Portland cements are not very homogeneous; fortunately, the discrepancy shown by the analyses is confined to the oxide of iron, which may be considered to all purposes inactive in the setting.

The carbonic acid is completely driven off, as might have been expected, by the calcination; and the proportion of water indicated by the analyses is so small, that we may consider the samples to have been very carefully preserved. They do not contain either sand or clay which would resist humid agency, from which we may conclude that the preparation and calcination had been conducted with the requisite care.

The proportion of lime soluble in water is tolerably large in all three specimens, but rather more considerable in the sifted cement; we have before remarked that the lime indicated by the analyses as soluble in water, does not represent in a correct manner the lime existing in the cement in the caustic form. We have pointed out two sources of difficulty:—1. It is possible that water, when used in large quantities, may carry off a portion of the lime combined with the alumina, and even with the silica; and this proportion would be greater in the case of the sifted cement, which contains more alumina in combination with the lime. 2. It is also to be feared that the water would carry off the whole of the lime existing in the caustic form, on account of the unavoidable admission of the atmospheric air into the phial containing the cement and the water, from which would result the partial transformation of the dissolved lime into the insoluble carbonate of lime; and also on account of the well-known power of adhesion of lime to porous substances. This difficulty is to be superadded to that necessarily felt on the subject of the oxide of iron, which can only be considered as entirely inactive in the sifted cement. Consequently, the quantity of lime marked in the table of the analysis as combined with silica and alumina, must only be taken as an approximation.

Bearing in mind these considerations, we are of opinion that the numerical results obtained show clearly enough that the combinations of the lime with the silica and alumina differ but little from those represented by the formula—

$$Si\,O^3 + 3\,Ca\,O,\ Al\,O^3 + 3\,Ca\,O,$$

the aluminate and silicate being partially combined together, and with a certain proportion of oxide of iron in the vitrified portions.

The Portland cements differ very much from the Theil limes in the proportion of free lime, which is much smaller in the presence of the aluminate of lime, and of the compound of silica, alumina, lime, and oxide of iron, in the most highly burned portions. The vitrified portions which are employed in the form of coarse sand may, nevertheless, prove a source of decomposition. The water and the small excess of free lime would act very slowly, and the transformation into hydrated silicate and aluminate of lime would not take place until after the setting. The danger would not be great in the ordinary case of a small proportion of the vitrified parts, and of a certain degree of porosity in the mortar after setting. Nevertheless, it appears to us advisable to separate the vitrified grains by sifting, and not to employ them until after a complete pulverization.

In an experiment recently made at Hâvre with Portland cement in a very liquid state, we were enabled to detect the presence of some of the vitrified grains remaining entire several months after the setting of the mortar.

The four analyzed specimens of the cements of Vitry le Français became set in soft water, and were not immersed in the sea. They represent, therefore, the particular condition of quick cements at the moment of setting, previous to the introduction of any of those chemical actions produced by prolonged exposure to sea-water. They all contain a considerable proportion of carbonate of lime, the presence of which is not sufficiently explained by the absorption of the carbonic acid of the air and the water; we think it is mainly attributable to the short duration and low temperature of the calcination.

The treatment of the cement with an excessive quantity of water carries off a certain proportion of their lime; but we may offer on this head the same considerations as in the case of the Portland cement, and we cannot say positively that the lime soluble in water is really in the caustic form in cement; it proceeds, more probably, from the decomposition by water (in the analysis) of a portion of the aluminate of lime. By deducting from the total quantity of lime that which is combined with the carbonic acid and that which is soluble in water, we ascertain the proportion of lime which is certainly in combination with the alumina and the silica. It is much smaller than in the Portland cements, and would not be sufficient to saturate at once both the silica and the alumina, which both act like acids. It is moreover very probable, from the known properties of silica, alumina and lime, that, during the burning of the limestone mixed with a very large proportion of clay, the lime would necessarily displace a large portion of the alumina if the temperature were moderate, or else produce silicate of alumina and lime under a higher degree of temperature.

It follows that the cements of Vitry le Français would principally consist of—

1. Silicate of lime, and an ill-defined combination of alumina and lime, which amounts to considering the alumina as inactive, for the most part, under a moderate calcination.

2. Silicate of lime and silicate of alumina and lime; which last is capable of being partially transformed by the water into hydrated silicate of lime, and inactive alumina, in the case of a higher degree of temperature in the burning.

The numbers given by the analyses agree very closely with these theoretical indications, and lead us to conclude that the two solid compounds—the silicate of lime and the silicate of alumina and lime—contain nearly the same quantity of oxygen in the silica and in the bases.

The quick cement (E) contains principally silicate of lime—

$$Si\,O^3 + 3\,Ca\,O + 6\,Ho,$$

with more of the alumina, almost inactive, in the hydrated portion; whilst the highly-burned cement (G) would contain nearly all the alumina in the form of silicate, combined with a proportion of water, small as compared with the two preceding materials.

The cements (F and H) contain only a portion of alumina combined with the silica; and so serve, as it were, for means between the two extreme descriptions before considered.

According to these theoretical indications, the cement (E) would give the best results in marine construction, for it is the only one distinguished by uniform action in the setting. Great care, and, probably, also a long course of experiments, would be required in determining the best mode of preparation so as to prevent porosity. That would be an indispensable condition of its employment, because the absence of free lime prevents the possibility of the formation of a protecting covering of carbonate. It is absolutely necessary, then, either to get rid entirely of the porosity in the preparation, or to arrange the works in such a manner as to assist the rapid accumulation of shells, sea-weed, or mud.

The highly-burned cement (G) contains almost exclusively hydrated silicate of lime and alumina, whose composition is very simple—

$$Si\,O^3 + (Alumina + Lime)^3 + 3\,Ho;$$

in which the two bases contain together as much oxygen as the silica. It is an insoluble compound, and would probably withstand the subsequent action of the water as well the silicate of lime. It might, therefore, produce favourable results when employed under the same conditions as the cement.

(E) The two others are so complicated, that we cannot expect the simultaneous setting of the compounds contained in them; it would, therefore, be prudent to reserve them for constructions on land, and confine ourselves to the two first for marine works.

The cements of Vitry le Français would certainly produce more favourable results in most constructions executed under water, if they were previously mixed with a certain proportion of hydrated lime, and the mixed materials allowed to remain sufficiently long in contact to permit the lime to act on the silicate of alumina and lime, and on the almost inactive alumina. By this preliminary treatment, all the chemical compounds existing in the cements would be changed into silicate and aluminate of lime, and a small excess of free lime would be introduced, necessary both for the slacking and for the ultimate preservation of the cement by the formation of carbonate of lime near the surface. In this manner the setting would be rendered more gradual, the working more convenient, and the durability after setting more certain.

The following appear to us to be the most suitable proportions of lime:—

For the cement	(E)	(not hydrated)	10 per cent. of hydrated lime
,,	(F)	,,	18 per cent. ,,
,,	(G)	,,	14 per cent. ,,
,,	(H)	,,	26 per cent. ,,

The time required for the mixed materials to remain in contact previous to their application can only be determined by particular experiment. We can only say that this preliminary process would require several weeks; a practical difficulty would have to be combated: viz., it would be necessary to keep the mixture in such a state of moisture as would allow the chemical action to take effect, without employing sufficient water to produce a partial setting. An excess in the quantity of water would be attended with the inconvenience of requiring a fresh burning before the cement could be used in construction: it would only be prejudicial in an economical point of view.

Table C.—*Artificial Blocks of Marseilles.*—We have submitted to analysis fourteen fragments broken off from the artificial blocks which have been immersed for some years at Marseilles, and which are still in a state of perfect preservation. The concretes were made with flint stones and mortar composed of sand and Theil lime; the immersion of the blocks took place shortly after their preparation, and, consequently, the carbonic acid of the atmosphere had no particular effect on the quantity of lime in excess contained in the limes of Theil. The sand employed in the preparation of the mortar contains a certain proportion of carbonate of lime, whose presence prevents us from drawing any conclusion from the proportion of the carbonic acid in the specimens under consideration. It is impossible to verify the theoretical and the practical indication which we have already described, viz., that the mortar should contain a much larger proportion of carbonate of lime near the surface.

In order to analyze them, we separated the flints and the coarse sand, so as to obtain more correct results for the composition of the mortar itself. But the proportion of coarse sand separated was so small that the numbers contained in Table C may be taken without appreciable error for the mortar as it exists after several years of immersion.

The composition of the mortar is very simple, and the causes of error in defining the proportions, and of uncertainty in interpreting the results, are but comparatively few in number. The two principal ones are those already frequently described by us; they relate to the determination of the hygrometric water, and of the lime soluble in water. As regards the free lime, we may observe that the numbers given in the analyses are too small.

The error in measuring the free lime answers to an error in the opposite direction with respect to the lime in combination with the silica, and consequently it is possible that the hydrosilicate would really contain a little less lime than is indicated by the analysis.

It is difficult to determine with accuracy the hygrometric water; and we cannot say positively that the prolonged dessication, at a temperature of about 110° centigrade, would not carry off a portion of the water in combination. There is, therefore, some uncertainty about the proportion of water contained in the hydrosilicate, and we think the numbers entered in the Table C are rather too small.

The alumina, oxide of iron, and magnesia, are much too small in proportion to produce any effect on the setting or durability of the mortar. The hydrosilicate is certainly the only active substance, and the average of the fourteen specimens ought to give a very close approximation to its composition.

This composition is extremely simple, and approaches so nearly to that indicated by the formula—

$$Si\,O^3 + 3\,Ca\,O + 6\,Ho\,*,$$

that it is impossible to entertain any doubts as to the existence of this very clearly defined compound.

The hydrosilicate forms only 25 per cent. of the whole bulk of the mortar, and must consequently possess very great durability, since the mortar has resisted the action of the sea satisfactorily for several years.

These results appear to us highly important. They prove that alumina, oxide of iron, and magnesia, are in no wise indispensable to the setting and durability of mortar. They show the possibility of producing artificially very good hydraulic lime by the calcination of intimate mixtures of limestone with very fine sand or powdered silica.

In the paragraph relating to the chemical action of the sea-water, we mentioned, as a principal condition of the durability of mortar made with hydraulic lime, the presence of a suitable proportion of free lime, as compared with the carbonic acid contained in the sea-water.

This condition seems to have been completely satisfied at Marseilles, in the case of the mortars made with the Theil lime, as the analysis shows only a very small proportion of lime soluble in water in the specimens under consideration. The excess of lime would have been partly dissolved in the water, and partly transformed into the insoluble carbonate. An idea may be conceived of the enormous excess of free caustic lime contained in the product of the calcination of the Theil limestone, by comparing the composition of the mortar with that made from other lime when both are confined to the same proportion of silica.

About one-third of the whole quantity of lime is not combined with the silica, and would be dissolved in the water before setting, or become carbonized before and after the setting.

These remarks lead us to infer that the Theil limes might fail in producing favourable results, unless particular care be bestowed on their application in the ports of the Channel, that is to say, under very different conditions from those under which they succeed in the Mediterranean.

We are of opinion that in the Channel ports it would be necessary to employ hydraulic limes containing a much smaller excess of lime. Very successful results would certainly follow from the moderate calcination of a very intimate mixture of powdered silica and tolerably pure limestone in the following proportions:—

Powdered silica.	20 to	22
Carbonate of lime	80 to	78
	100	100

In order to employ successfully the Theil lime, or any similar description, it would be necessary to combine a portion of the excess of lime with the carbonic acid, by a lengthened exposure to the atmospheric air, or else to manage the calcination in such a manner as to leave a considerable portion of the carbonate of lime undecomposed.

Table D.—*Analysis of the Blocks submerged in front of the Pier at Cherbourg.*—These blocks were constructed under peculiar conditions, which will be described in the second part of our notice. Mixtures of the natural and artificial cements, known as Parker's, Medina, and Portland, with sand, were used for the mortar employed in uniting the broken stones. These blocks have been submerged for several years, and present no trace of decomposition. Our analysis will therefore be directed to hydraulic materials of excellent quality.

As the sand contains no carbonate of lime, the carbonic acid indicated by the analysis would certainly be derived from the atmospheric air and the sea-water. It had been absorbed by the free lime during the preparation of the blocks, and especially after their immersion; its amount is very small, and so it ought to be, as the cements employed contain only a small quantity of free lime. The specimens analyzed were taken from the angles of the blocks, and we deeply regret that we could not procure some fragments from the interior; it would have been extremely interesting to determine whether the proportion of carbonic acid were greater towards the surface, in the manner indicated by theory.

There is yet more uncertainty on the subject of the lime soluble in water n the Cherbourg blocks than in those at Marseilles. It is by no means certain that it would be present in the mortar in the form of free hydrate; it might proceed from the action of the excess of water on a portion of the aluminate of lime. The same difficulty attends the determination of the hygrometric water. A prolonged desiccation would probably have driven off a portion of the water in combination; on the other hand, the composition of the mortar is so complicated, that it is almost impossible to distinguish the various forms of combination of the water. The numerical results obtained for the proportions of silica, alumina, and lime, which are, or at least, might be, in combination, do not enable us, as in the case of the Marseilles blocks, to determime the formulæ of the different compounds; but we may ascertain the nature of the principal combinations contained in the four specimens analyzed—keeping in view the observations we have made in a former paragraph.

Thus we have found in the analysis of the Portland cements, that the lime is combined respectively with the silica and the alumina in the less highly burned portions; whilst the alumina is combined in large quantities with the silica and lime in the angles of the blocks, or in those portions exposed to a higher temperature. In these compounds, the lime contains nearly as much oxygen as the silica and alumina.

Let us now take the mortar No. 4, made with Portland cement and sand. It is clear that nearly the whole of the free lime has been either dissolved by the water or transformed into the carbonate. The silicate of lime remains unchanged in its composition—

$$Si\,O^3 + 3\,Ca\,O.$$

As to the aluminate, it may be almost entirely restored, if we admit that the lime soluble in water, indicated in the analysis, proceeds principally from the decomposing action of the large excess of water on the aluminate. It is, consequently, very probable that the Portland cement employed in mortar No. 4 contained only a small proportion of the vitrified parts. It is impossible to determine what quantity of water is in combination with the silicate and the aluminate of lime, for the reasons already given; we can only conjecture that the proportion of water is smaller than in the Marseilles mortar: it seems to approach very closely to the formula—

$$3\,H\,O + Si\,O^3 + 3\,Ca\,O.$$

This hypothesis would lead us to suppose that the silicate of lime might be combined with water in two different proportions, according to circumstances, and probably according to the temperature of the calcination and that of the sea-water.

The mortar marked No. 1 was made with a mixture of Portland and Parker's cements with sand, and, under the same conditions as No. 4, would be attended with similar results.

The mortars used in the blocks Nos. 2 and 3 were made with the natural cements known as Parker's and Medina. We could not procure specimens of these two cements as used at Cherbourg, and consequently cannot compare the analysis of the mortar with that of the cement. We can only conclude, from the results of Nos. 2 and 3, that there is but very little difference between the two cements sold as natural cements under the names of Parker's and Medina, and that they possess great resemblance to highly burned Portland cement *. The mortars still contain a certain proportion of alumina, combined with the silica, but the greater part of the aluminate of lime has been already decomposed by the sea-water. The small quantity of lime soluble in water, indicated by the analysis, proceeds most probably from the aluminate of lime, the decomposition of which is completed by the excess of water employed.

It follows from these remarks:—

1. That, in the four specimens analyzed, the free lime, the quantity of which is very small in cements, has been either transformed into the carbonate, or dissolved by the water, or else has acted on the clay mixed up with the sand. The mortar would probably contain no more, although in the analysis the water would still carry off a little of the lime.

2. The mortars Nos. 1 and 4 contain the two active compounds, silicate and aluminate of lime, which seem to correspond very closely with the formula—

$$Si\,O^3 + 3\,Ca\,O,\ Al^2\,O^3 + 3\,Ca\,O.$$

They are hydrated, but contain, perhaps, less water than we found in the Marseilles blocks. The numbers given under this head in the analysis are very uncertain; and we feel great hesitation in suggesting the proportion (3 Ho) for each of these compounds.

3. The mortars Nos. 2 and 3 contain also a small quantity of alumina combined with the silica; and the aluminate of lime seems to have been partially decomposed by the water. The blocks owe their solidity principally to the hydrated silicate of lime, for which the results of the analyses again give the formula—

$$Si\,O^3 + 3\,Ca\,O + 3\,Ho$$

with very considerable exactness.

We thus recognize in the Cherbourg blocks the same composition of the silicate of lime as in the Marseilles blocks; and we are warranted in the conclusion that that silicate is the true permanent hydraulic compound, and that which must be mainly sought for in mortars employed in the sea-water.

4. The texture of the Cherbourg mortar is so close as to prevent the ready renewal of the water in the inner substance of the blocks, though constantly submerged. It is to this favourable condition that their good preservation is to be attributed.

The Portland, Medina, and Parker's cements would not, perhaps, always give such favourable results when employed under different circumstances. They do not contain enough free lime to allow the formation of such a quantity of carbonate of lime, shortly after setting, as would stop up the pores near the surface, and effectually oppose the penetration of the sea-water †.

Mortar taken from the Quay-Wall of the Basin of La Floride, at Hâvre, constructed upwards of sixty years ago.—The two samples present nearly the same composition; we shall, therefore, simply consider the mean of the two analyses.

They contain a very large proportion of carbonic acid, the greater part of which would have been absorbed previous to the application of the mortar. We have, in fact, obtained satisfactory proof that in the construction of the quay-wall of the Florida Basin, the hydraulic lime was exposed for several months to the atmosphere. Under these circumstances, the carbonic acid had saturated the free lime, and perhaps also carried off a certain quantity of the base from the silicate. The setting was produced by the hydration of the silicate of lime, which seems to have resembled in composition that of the Marseilles lime—

$$Si\,O^3 + 3\,Ca\,O + 6\,Ho.$$

Being no longer protected by the excess of lime, the silicate has been gradually decomposed by the carbonic acid, and at the time of its demolition only contained a very minute quantity of lime. It is, therefore, impossible to infer, from the analytical results obtained from these mortars, the existence of a silicate of lime different from that already described.

Table E.—*Puzzuolanos.*—We have collected in Table E the results of the analyses of five specimens of puzzuolanos, employed with more or less success in hydraulic works. It is impossible for us to base any conclusions upon these results, because we have no sufficiently correct information as to the part taken in the setting by the oxide of iron and by the alkalis. We even feel considerable hesitation in expressing the very probable opinion, that the energy of a puzzuolano is greater, in proportion to the quantities of silica and alumina it contains, and which are accessible to the ordinary agents of the humid way.

It might be of use to examine attentively what are the principal actions likely to be produced in puzzuolano mortars, under the two divisions of rich lime and hydraulic lime, the use of which has been recommended by distinguished engineers. Let us take, for example, a mortar composed of Dutch traass and rich lime. Let us suppose the materials mixed dry, with proper care, and the mortar immersed with very little delay.

The first action would certainly be the hydration of the lime; then would succeed its partial dissolution, its gradual combination with the carbonic acid, its slow action on the salts of the sea-water, and the principal action,

* This formula, reduced into decimals, gives—

Silica	24·68
Lime	46·92
Water	28·40
	100·00

* It may hardly be necessary to remind the English engineer that there is a very great distinction between the natural and the artificial cements both in their chemical and their mechanical composition. The Parker's (Roman) and the Medina cements are made from the calcareous nodules, the *septaria* of the tertiary clays of the Hampshire and of the London basins, and they are only exposed to a moderate calcination. The Portland cements are obtained by the artificial mixture of chalk and clay, which is subsequently exposed to a very great degree of heat.—G. R. B.

† We might give a wider interpretation to the preservative action of the carbonate of lime formed subsequently to the setting. The principal effect produced is certainly the stopping, to a great extent, of the pores at the surface; or even, in some cases, the entire covering of the construction with a coat of carbonate of lime; but this action would be continued by very slow degrees towards the interior, and then the carbonate of lime lines the sides of the pores, and produces a similar preservative effect.

more or less rapid, of the lime on the puzzuolanic material. This action requires a very long time for its completion, but it would vary according to the nature of the puzzuolano, the intimacy of the mixture, and the surrounding temperature.

Before going any farther, we may draw, from what has been said above, a very important condition of success, viz., that it is indispensable that the proportion of lime employed in the mortar should be greater as, according to the circumstances in which the mortar is placed, a larger portion of it would be removed from the principal action by dissolution in the water, by combination with the carbonic acid, or by the action of the salts contained in the sea-water. It would, therefore, be absolutely necessary to vary the proportion of lime with the same puzzuolano according to the particular conditions of each locality. The immediate immersion of puzzuolano mortars thus introduces into the problem under consideration the proportion of lime as a variable quantity, the proper value of which it would be extremely difficult to determine by actual experiment.

We will now consider the action of the lime on the puzzuolano. So long as there remains a sufficient excess of lime, it would decompose the complex silicates, producing silicate of lime, aluminate of lime, and a compound of oxide of iron with the lime possessing no durability. The magnesia probably remains in combination with the alumina or the silica; the alkalis are, perhaps, gradually carried off by the water. On this point we can only express a doubtful opinion, but it would, nevertheless, be very interesting to know exactly in what manner the alkalis act, as their proportion is very large in several of the puzzuolanos employed.

Apart from this source of uncertainty, we see that the setting would be necessarily progressive, inasmuch as the lime cannot rapidly decompose the whole of the silicate in the puzzuolano in the humid way, and at the ordinary temperature; consequently, the disintegration of the mortar is always to be feared, when set for a certain time, on account of the continued action of the lime on the more resisting portions of the puzzuolano.

It would, therefore, be necessary to limit the proportion of lime to that which would be strictly required to produce the transformation of the portion of the puzzuolano which would be attacked with comparative ease. It is impossible to attain this condition in many constructions, because it is impossible to tell beforehand what proportion of the lime employed would really act on the puzzuolano. It must be used in excess, and thereby the mortar is exposed to numerous causes of decomposition, viz., the decomposition resulting from the continued action of the excess of lime on the puzzuolano, and that already described as arising from the water, the carbonic acid, and the salts contained in the sea-water. With these difficulties before him, it is clear that the engineer cannot determine with certainty the proportions and mode of application, and consequently exposes himself to the danger of the failure of his constructions.

We have already pointed out the means of greatly diminishing, and even altogether avoiding these difficulties, by exposing the mixture of the puzzuolano and of the hydrated lime to a long-continued digestion previous to use: the chemical actions would be forwarded in such a manner as to leave only the hydration of the compounds to be effected after immersion. We would again remark that this precaution, which was probably observed by ancient engineers, is still adopted in many countries, and particularly in those where puzzuolanos produce good and lasting results.

Mortars composed of puzzuolanos and hydraulic limes would be still more difficult to manage than those in which the rich limes are used. Hydraulic limes contain silicate and aluminate of lime, and a greater or less excess of lime in the caustic form. This last alone would act on the puzzuolanos; and, consequently, it would be necessary to employ a quantity of hydraulic lime which would be greater in proportion as the hydraulic properties of the lime were more remarkable. It would then be essential to determine the precautions required for regulating the setting of the silicate and aluminate of lime formed in the dry way, so that it should be nearly contemporaneous with the solidification of the corresponding compounds produced in the humid way.

This regularisation can only be effected by a long previous treatment, with a quantity of water sufficient to facilitate the action of the lime, but too small and too uniformly distributed to permit the formation of hydrated combinations. These conditions are certainly very difficult of attainment, and require several series of practical experiments.

The rocks of volcanic origin, which have been hitherto employed as puzzuolanos, might be advantageously replaced, at least in certain situations, by the artificial silicates. We would cite the slag of blast furnaces and the scoriæ of iron-works. The slag, finely powdered, and intimately mixed with a large proportion of lime, varying from 70 to 80 per cent., would certainly produce mortar of very good quality after a preliminary treatment.

The scoriæ might, perhaps, produce less favourable results, on account of the enormous quantity of oxide of iron contained in them. The oxide of iron would partially combine with the lime; but the perishable nature of this compound might give rise to the ultimate disintegration of the mortar.

In short, all the silicates of alumina, simple or complex, natural or artificial, which are found in the laboratory to possess the property of being readily attacked by chemical agents of the humid way, may be employed as puzzuolanos. We would also remark that in each case the proportion of lime, and the precautions to be adopted in application, must be determined by actual experiment.

Amongst the more important precautions to be observed, we must, however, always include a protracted contact between the moistened materials previous to immersion.

(*To be continued.*)

Woolwich, Plumstead, and Charlton Consumers' Gas Company.—An extraordinary meeting of the proprietors of this company was held on Tuesday, the 1st inst.—Mr. Lewis Davis in the chair—in pursuance of the following requisition addressed by 40 shareholders to the directors:—"Gentlemen,—Reports having reached us that serious defalcations have been discovered in the accounts of the company, which, together with the late proceedings against the secretary, have disturbed our confidence, we therefore request that you will convene an extraordinary meeting of shareholders, for the purpose of taking into consideration the financial and other affairs of the company, with the view to the adoption of such measures as the said meeting may deem expedient." The following was the first resolution put and carried—"That a committee be appointed to investigate the accounts of the company, with full power to examine all books and servants of the company, and, if they should think fit, to engage the services of an accountant; and to report to the shareholders at an adjourned meeting." It was then moved and seconded, "That the committee consist of the following gentlemen:—Messrs. Willes and Taylor, directors; Messrs. Whiteman and Henderson, auditors; Messrs. Starmer, Starling, Moore, Baker, John Thomas, and Dane, shareholders." Whereupon an amendment was moved and seconded, "That the following gentlemen be the committee:—Messrs. Barry, Baker, Dane, Symonds, Starling, shareholders; Messrs. Davis, Hammond, Dixon, Cohen, Plaisted, directors. With power *to appoint an independent chairman;* to inspect all books, documents, and vouchers, and to call and examine as evidences all persons whom they may think proper." Prior to taking the show of hands a ballot was demanded in accordance with the Act of Parliament, which took place on the 10th and 11th inst., when the resolution was confirmed by a large majority.

Lighting Ramsey with Gas.—The *Mona Herald* of the 25th ult. contains an account of the lighting-up which took place on the previous Saturday, and was highly creditable to all concerned:—"Mr. Cowell's loyal motto, in the centre of which was a crown of Herculean dimensions, was a splendid affair. Mr. Corkhill had the pleasure of beholding his star shining most conspicuously, and eliciting the tremendous applause of the populace as the 'northern light.' In addition to the illuminations of Thursday, a planet, which we supposed to represent Venus, and a small V. A. were brilliantly burning in front of the establishment of Mr. Teare, draper; and another star appeared over the Saddle Inn. The designs at the Market-Place poured out such a flood of light that the most minute article of a lady's toilet might be discovered on the ground. The gas was pure, and considered to be very good, and reflects much credit on all concerned. Mr. Alfred Penny, of London, the contractor, was repeatedly cheered as he passed through the streets, and must have been pleased to receive those stentorian ebullitions of satisfaction. We may state that all the shops, hotels, &c., are or will be consumers, and many private houses; and we hope that the directors will, with a spirit of liberality becoming the age in which we live, throw out every facility for general use in the shape of good and cheap gas."

Opening of the Aberavon Gas-Works.—About three months back the tradesmen and others interested in the prosperity of the above town determined to have it lighted with gas. Accordingly, a prospectus was issued, the inhabitants subscribed liberally, and a company was at once formed. The capital was to be £1800, in 360 shares of £5 each. Messrs. T. Atkins and Son, of Chepstow, undertook to complete the works for the sum of £1475; their tender was accepted, and in the short space of three months the works are in operation. It was decided at a vestry meeting recently held to erect 20 public lights. The works are arranged for double extension, the carbonizing power equal to 11·500 cubic feet per 24 hours, the condensers and purifiers double that amount; the storage 7500 feet; the governor 5-inch bore; the distributing power equal to 3000 feet per hour, including one-third of a mile of 4-inch bore, and a mile and a half of smaller sizes. The loss from escapes when last tested was less than two cubic feet per hour at full pressure. Thus, it will be seen that Aberavon possesses one of the most complete and efficient works in Wales. The town was lighted for the first time on the 7th inst., the opening being duly celebrated by fire-works, &c., and a dinner at the Walnut Tree Inn.

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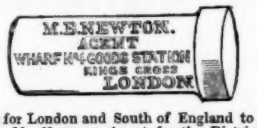

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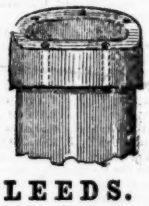

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